In This Issue: Electricity on the Farm—a Harvest Number

INVEST IN LIBERTY BONDS

JOURNAL OF ELECTRICITY

VOL. 41 NO. 7 SAN FRANCISCO, OCTOBER 1, 1918 PER COPY, 25 CENTS

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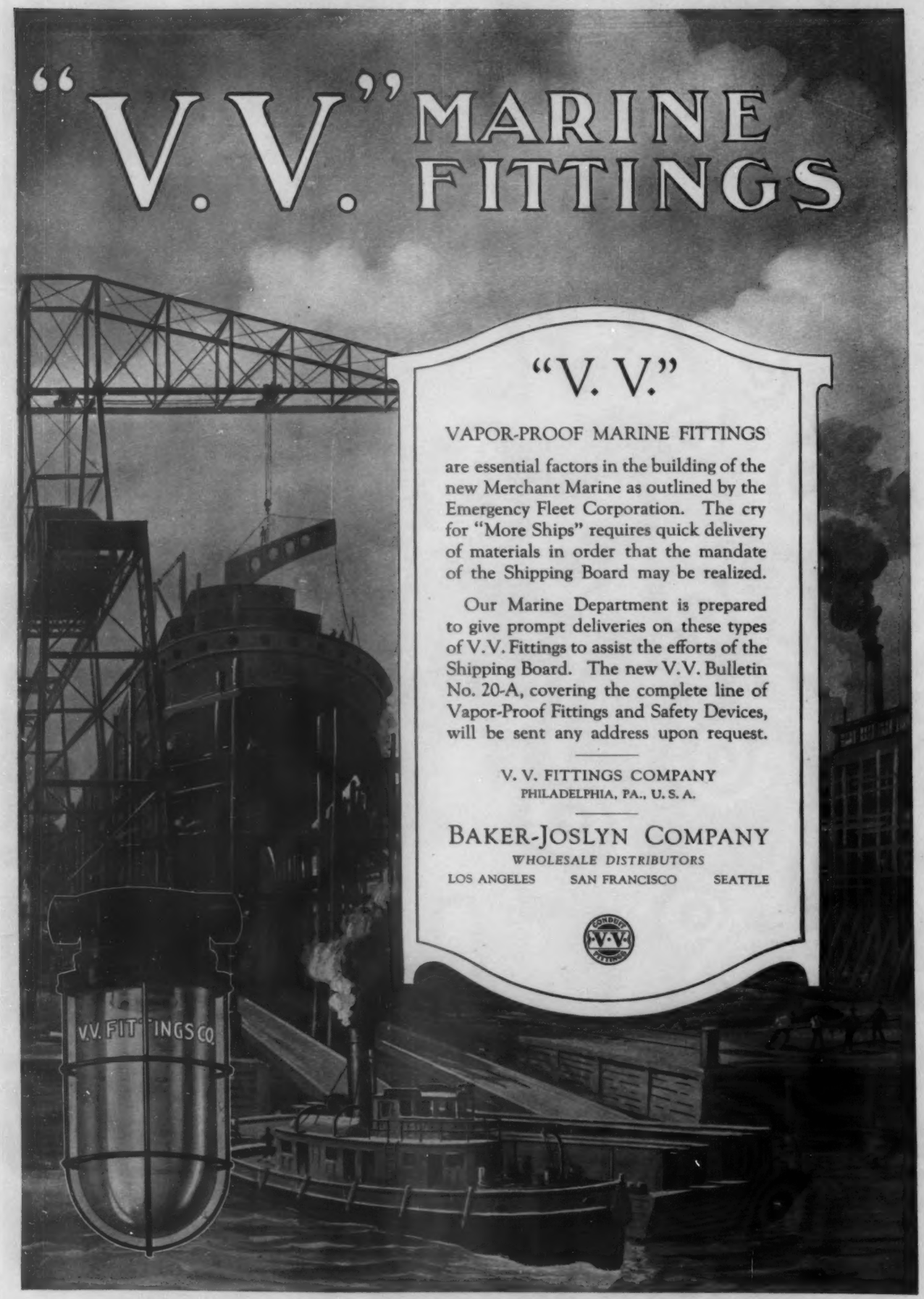
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JOURNAL OF ELECTRICITY

FOUNDED 1887

ROBERT SIBLEY, Editor — CLOTILDE GRUNSKY, Associate

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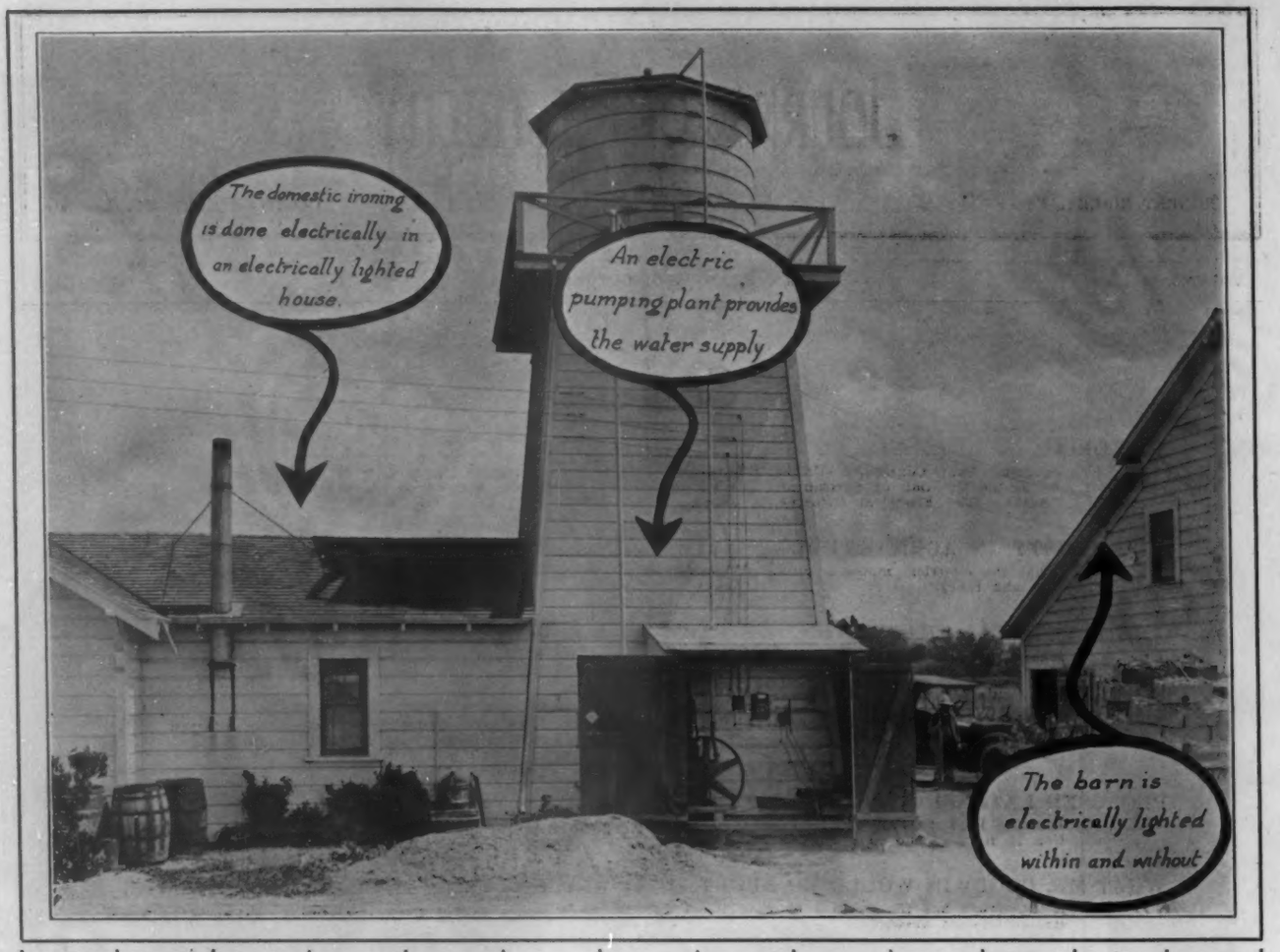
The domestic ironing is done electrically in an electrically lighted house.
An electric pumping plant provides the water supply
The barn is electrically lighted within and without

War Service of Electricity on the Farm

LIKE the sparkling rivulets of the mountains that in the aggregate drive the vast power plants in the mountain fastnesses of the West, so the small farm unit electrically operated in this empire is today contributing a war service to the nation that in the aggregate it is hard properly to evaluate. In California alone a billion dollars in agricultural wealth is being produced this year and the vast array of little 5½-acre farm units such as that of J. S. Serva of San Lorenzo, California — electrically equipped — is the real backbone of national agricultural strength in the West. In rhubarb, pears and apricots this little farm nets the owner between $200 to $300 per acre annually. Electricity aids in lightening the labor of the home in ironing and washing and in netting increased returns on the farm produce by efficiently pumping water for irrigation. And best of all the after-the-war value of all this productive investment in the West means an assured asset of wonderful proportions throughout all posterity.

OCT - 7 1918

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JOURNAL OF ELECTRICITY

DEVOTED TO THE UPBUILDING OF THE ELECTRICAL INDUSTRY IN THE WEST AND IN THE COUNTRIES BORDERING THE GREAT PACIFIC

Volume 41 SAN FRANCISCO, OCTOBER 1, 1918 Number 7

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SQUARING YOUR CONSCIENCE

The first Liberty Loan was an easy thing to subscribe from peace filled pockets, but with the pressure of war taxes and businesses hard hit by priority rulings, the loan today means the giving of more than spare cash, the making of more than minor sacrifices. But we are glad to bear the burden. We did not go into this war only to the extent that it might be easy—we went in to the last supreme sacrifice until that ideal for which we fought should be attained. Many of our brothers and our sons have already paid with their lives—and in healthy youth it is no easy thing to die—many are today suffering a myriad discomforts, toiling long hours at the hardest of tasks, risking dangers at every moment for a meager salary, with the knowledge that their businesses at home are not always waiting their return. And they are doing this gladly. Those of us at home with a responsibility no less, are merely asked to pay in money and time and in the little sacrifices that it may involve. It may be we should rather be "over there" than meeting the inglorious task to which our responsibilities hold us — but the essence of that wish is the willingness to sacrifice and its sincerity is to be measured by the acceptance of the opportunity at hand. The Fourth Liberty Loan is not only a responsibility—it is a chance to square up with a conscience ashamed of passing its burdens to the "boys." Six billion dollars is the largest sum ever called for at one time by a nation from its citizens—it means that we must give twice the amount from a poorer store — but we shall oversubscribe the limits of the Loan, and we shall do it gladly.

United Engineering Effort

The suggestions recently offered through the editorial columns of the Journal of Electricity for united engineering effort during the coming months have received favorable comment and action from many quarters.

The largely attended gathering at the San Francisco Engineers' Club on Thursday, September 26, 1918 attested the possibilities of united effort on war service. The subject of the evening was "Fuel Conservation" and the discussion was participated in by representatives of the fuel administration, the railroad commission, the war industries board, the national army, and a host of engineers and representatives of the oil and power industry.

This meeting was under the auspices of the local section of the American Society of Mechanical Engineers and to the able effort of E. C. Jones, its chairman, much credit must be given for the wonderful manner in which the program was prepared and carried out.

The next meeting is to be on the evening of October 25, 1918, and the subject will be "Unification." The leading paper will be on telephone unification work in Los Angeles followed by papers showing the magnificent unification work that has been accomplished in shipbuilding, transportation and other war service effort of the hour. This meeting will be under the auspices of the American Institute of Electrical Engineers.

Such helpful meetings as these are only the beginning of possibilities in getting unified and timely discussions on war activities in engineering throughout the West.

The recently formed local organizations of the five engineering societies in several large centers of the West are to be congratulated upon their splendid united effort.

The Deplorable Utility Law in Washington

The State of Washington, in many ways so brilliant in broad-visioned enactment, is certainly far behind the spirit of the times in other phases of utility regulation and fairness in control of rate fixing.

For a legislature to enact laws for regulating utility activity granting to the commission the right to fix rates — that is for lowering rates, if found desirable and then giving no relief for raising of fares—is at once inconsistent and absolutely unfair in premise.

Long since the public has come to a full knowledge of the situation in regulation of rates—that rates are based upon cost of service and as a consequence the one fundamental fact to be ascertained is the true cost. With these data at hand, which are now available by law to every regulating commission, the actual fixing of rates becomes a mere detail of simple arithmetic.

It requires no great mental vision to see that cost of service depends largely upon the market value of labor and material. Today these two commodities

VON HINDENBURG is reported both dead and alive—don't put yourself in a similar position by giving no answer when called upon—

BUY LIBERTY BONDS

have advanced beyond all previous bounds. Hence for a great commonwealth not to make provision for the raising of rates as well as their lowering is manifestly unjust.

It is truly to be hoped that every broad-visioned citizen in the State of Washington will take immediate steps to urge the amending of the present enactment relating to the raising of rates within the confines of that commonwealth.

As to the Question of Surcharges

The entire utility world has followed with considerable interest the doctrine of surcharges that has recently been promulgated in California to meet the exigencies of high cost of labor and material in rendering service to the public during the present national crisis.

Acting upon the conviction that these demands for increased rates are abnormal, reflecting only the conditions brought on by the war, the California Railroad Commission has of late granted surcharges or stipulated sums or percentages of increase to meet these abnormal demands. It is of course tacitly understood that when the disturbed conditions adjust themselves after the war the surcharges will be done away with.

It is interesting to note that a resolution was passed at the recent convention of the Northwest Electric Light and Power Association in which it was stated that effort would be made in the forthcoming campaign of public education in the Northwest for higher rates to have the cases considered by the public solely on the problem as a whole in the cost of rendering service, and hence the fixing of a proper rate readjustment without using the means of surcharges.

Undoubtedly this is the fundamental and sound basis for reasoning. There is some question, however, whether the public can grasp such reasoning as quickly as when the rate raise is put on the emergency basis. In fact, the great international crisis is still in such a state of stress it is questionable whether the emergency basis is not after all the better method of procedure.

The one positively sure basis of reasoning in these uncertain times is to try and meet each day's needs as the emergency arises. Never before in its nineteen hundred years of utterance may the Biblical quotation be followed with clearer light—"Sufficient unto the day is the evil thereof."

And while the question of rate raising is in no manner to be considered the combating of evil, still in the sense that it is a vexing problem, fraught with hosts of world problems of the most trying nature, it would seem that the emergency basis of rate raising has many commendable features.

The National Electrical Safety Code

Something over a year ago the Journal of Electricity undertook the problem of pointing out the reasons why the National Electrical Safety Code prepared by the U. S. Bureau of Standards at Washington, D. C., had not received the whole-hearted endorsement of the electrical industry throughout the West. The criticisms that were pointed out editorially through the columns of the Journal of Electricity in its issue of Oct. 1, 1917 entitled "Overdoing Accident Prevention" met the immediate and courteous attention of the technical staff of the Bureau at Washington, and in the year just passed a gigantic stride toward a full understanding has been brought about.

It is interesting along these lines to note in passing that the hydroelectric committee of the Northwest Electric Light and Power Association at the recent one-day convention of the association in Portland reported that the revised Code of the Bureau of Standards, which has been brought out during the current year, has eliminated many of the objectionable features that formerly appeared, and that the committee now stood ready with such complete information and data to present to the Bureau that it believed would make possible a full understanding so that a final revision would make the code entirely acceptable throughout the West. In this connection it was pointed out that the Northwest Electric Light and Power Association is working in entire sympathy and along parallel lines with the Pacific Coast Section, N. E. L. A., between which association an interchange of members and discussions on the Safety Committee is made at all annual sessions.

The entire situation, beginning as it is to clarify, is to be recognized as a source of congratulation from all quarters and it is to be hoped that such remaining differences as still may exist will be adjusted at the earliest possible moment.

New Ideal of National Training

To the engineer, vocational and technical training along broad lines of effort are always interesting and instructive.

With all its horrors and suffering already there is springing from the world war ideals of national life that will perpetually bless mankind and make this a better, more wholesome world within which to live.

How reversed today is public sentiment over what it was five years ago. National training and discipline of our youth are fast becoming ideals toward which thoughtful men are leaning.

There is no question but that the present draft has created a community of interest among all classes

---

THE NEW JOURNAL SERVICE:—The next issue of the Journal of Electricity will feature a Jubilee issue commemorating the thirty-one years of the life of the Journal of Electricity in its service to the West. Among a notable series of displays in this issue will be a comprehensive and accurate map of the vast transmission systems of the West. November 1, 1918 will feature Salvage of the Waste in Power Plants and will present new and helpful ideas of saving the waste.

To the contractor-dealer attention is especially called concerning a series of articles on "good merchandising" that will begin in an early issue that has especial emphasis in these days of tying in with national service. The data presented will be from a survey of western jobbing and contractor-dealer establishments undertaken by the editorial staff of the Journal of Electricity.

in America that savors more of true democracy than any one advance of our national life since the founding of the American Republic.

Unquestionably the national service and discipline of our youth must ever be freed from the domination of the spirit of militarism. At the same time the nation wide training of all our citizens during certain years of their youth is a national ideal the good effects of which can hardly be overestimated.

As a beginning toward this ideal let us briefly review the induction into service proposed for over a hundred of our universities of college students during the coming fall months.

By induction into the corps registrants will become privates in the United States Army and will receive from the government uniforms and equipment, housing and subsistence, and pay at the rate of $30 per month. They will also be regular students of the university, and will be required to follow the university program and to comply with all university regulations. The work of members of the corps will be constantly watched and carefully graded in order to determine their fitness for various military activities, and from time to time, as the requirements of the service demand, men will be selected and assigned to duty. Some will be transferred to central officers' training camps, some to schools for non-commissioned officers, some to cantonments for service in the ranks; others will be assigned to classes in this or another university for special intensive work, others to a vocational training section of the corps for technical training. The unit will probably be maintained at the desired strength by inductions and transfers. It is believed that all members of the corps, with the exception of some students in technical fields, will be assigned to active service at the front by June 1919.

This of course is only a war measure along educational and vocational lines. But beneath it all is a fundamental principle of possible development of community spirit that with necessary modifications may well be applied in after war periods in the handling of national problems and activities wherein the youth of our nation could be profitably employed for a period of say two years.

The Electrical Industry in Japan

To hear the real facts of the Japanese situation in its relation to America and China was the rare treat of those who listened to the splendid remarks of J. R. Geary at a recent meeting of representative electrical men in San Francisco. Mr. Geary has for fifteen years been the representative of the General Electric Company in Japan.

The Japanese situation is one in which Americans as a body are intensely interested but to electrical men it is at this time of peculiar interest in the West.

In the address referred to attention was called to the fact that although the total territory of Japan is only about the size of California with but one-tenth of that area cultivable, still fifty-five million people dwell there. Their imports have in four years increased 42 per cent, now totaling over five hundred million dollars in value, while their exports have increased 153 per cent, with a total of over eight hundred million dollars in value. It is interesting to note that her imports from China total fifty-six million dollars, her exports one hundred and forty millions.

There is an underlying conviction among all thoughtful men in the West that the immediate after-the-war period will witness a much closer engineering and commercial relationship between America and the countries of the Far East and in this increased relationship it is believed that affairs electrical will receive the major consideration.

It has been the announced policy of the Journal of Electricity for many months, agreeable to the ideals of President Wilson, that its international effort shall be devoted toward forwarding the settlement of every question, whether of territory, of sovereignty, of economic arrangement or political relationship, upon the basis of the free acceptance of that settlement by the people immediately concerned and not upon the basis of the material interest or advantage of any other nation or people which may desire a different settlement for the sake of its own exterior influence or mastery.

And so, in building up the splendid new international relations among the countries that border the Pacific, we shall unqualifiedly endorse every published or spoken statement that will aid in forwarding these ideals that mean so much for the future peace of the world. After all, the ideals of a nation are but the expression of the composite ideals of its citizens. Hence anyone aiding in the molding of this fundamental ideal in the heart of each citizen is aiding most effectually in bringing in a permanent world peace.

And so it was indeed refreshing to hear one so well qualified to speak from fifteen years of the most intimate business connections in Japan such forceful and convincing statements of the desire of the leaders of the Island Kingdom, both from economic and sentimental reasons, to preserve the most intimate and friendly relations with America.

Japan, China, Siberia and the other great nations of the Far East all have a potential part in maintaining the peace of the world. With a civilization that antedates ours by thousands of years there is much from them we may well follow.

And in giving to them the enthusiasm and life-giving energies of our modern engineering and commercial life, let us build our new era of mutual helpfulness upon an enduring foundation, and cast from our international life in commerce and engineering, should occasion ever arise, anything that goes not toward mutual helpfulness but toward domination of any one nation over another.

SAMSON'S strength was in his hair—
a republic's strength lies in the sense
of duty of its citizens—

BUY LIBERTY BONDS

"ELECTRICITY IN AGRICULTURE"

(Electricity on the farm is a patriotic necessity. The farmer is already better "sold" on the subject of electric appliances than is even the city man. Who is to do the selling? A collection of facts, figures, suggestions and selling arguments pertinent to the situation in the West. —The Editor.)

THOUGHTS

The central station manager, the electrical engineer, the commercial man, and the farmer who does not appreciate that the era of "Electricity on the Farm" is here is behind the times. Men in the electrical business thinking nationally recognize this. We only have to look at the money which the management of one electric company is spending on a farmers' electrical handbook, a finely produced publication answering the farmers' questions about electricity, and a catalogue on electrical appliances and machinery applicable to farm use. We cannot appreciate for a moment that the management of a company of this size, who are held responsible for profits, would spend their money for this publication and advertising in twenty odd farm magazines unless they knew for a fact that it would pay.

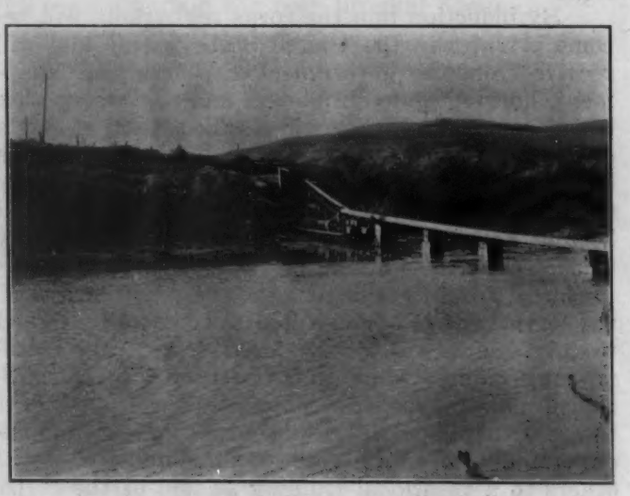
* * *

Individual Lighting Systems.—The fact that it is reported they are selling 75 or 80 equipments a day, largely in the central west, indicates the rural communities are anxious to have electricity. In most selling campaigns we first have to get attention, then interest, and then desire. The farmers already have the desire; therefore, what more can the central stations ask? Three-quarters of the selling campaign is already completed. It is only necessary for you to create the action.

* * *

As it is a common complaint throughout all the States of our country that farm labor is scarce, that it is not dependable and possessed of the required amount of skill and intelligence, does it not follow that electricity can in part fulfill the functions of the hired man?

The farm is the source of the greater portion of all the wealth in the world. In recent years the production of farm crops has not been keeping pace with the enormous and ever increasing demand. This is due to a shortage of farmers and farm labor. Too many farmers' boys go to the city. Many of these could be retained on the farm if their labors were lightened and conditions improved. The war in Europe has its effect on farm labor. The eight-hour day in industrial pursuits affects farm labor, also. The drudgery of the farm and the long hours take the young women to the city also.



SEMI-PORTABLE CREEK PUMPING PLANT

A 15 h.p. 1800 r.p.m 220 volt, 3-phase, 60 cycle motor belted to the pump which runs 10 hrs. a day, costing about $1.75 to $2.00 and pumping enough water for 2 acres. When flood waters come the owner takes the pump and motor out of the creek and stores them in his barn.

A small motor is an invaluable adjunct to the farm and with the use of light armored cable and a safety first switch can be moved from place to place where needed. This is a 5 h.p., 1200 r.p.m., 60 cycle, 220 volt, 3-phase motor belted to a cross cut circular saw. The owner has a small electrical distributing system on the ranch which reaches the principal points, from which he then runs a temporary line to the grove or spot where the motor is needed.

Electricity is needed in connection with practically all the modern improvements on the ranch. There is a 50 h.p. installation on the place illustrated in this picture. Most of the current is used for pumping for irrigation purposes but there is also a small refrigerating plant and the motor shown here which is used for driving a feed cutter in conjunction with the filling of the silos.

Imagine an average farm home without modern improvements and conveniences. Picture to yourself an average farmer's wife as she goes through her daily routine. Follow every step from the time she starts the fire in the frigid kitchen until she lays wearily down the last pair of mended stockings at night.

Now by magic transfer her in her sleep into a house with just the plain conveniences; a heating system; running water, hot and cold; a bathroom with lavatory, closet and bath tub; a sanitary system of sewage disposal; a power plant that not only pumps the water, but runs an electric lighting plant with storage battery; a power washing machine and wringer; a power separator and churn; a vacuum cleaner, and perhaps an electric flatiron and a little motor to run the sewing machine.

Give her an extra hour to sleep. The kitchen is warm, the water is hot, and she can get breakfast in a jiffy on the electric range. Now picture to yourself her day's work and her day's uplift to body, mind, and soul. It is the difference between losing and winning, between conquering and being conquered. No magic could work a greater transformation or bring greater joy and comfort.

* * *

Wherever there is a gas engine there is a prospect for an electric motor.

* * *

Farmers use electrical appliances, such as electric ranges, irons, percolators, toasters, washing machines, sewing machine motors, etc., more generally and readily than do city people.

* * *

The farmer is indicating his desire for electricity by the large sales of farm lighting sets such as several manufacturers are putting out.

* * *

If the farmer will pay the relatively high prices demanded for farm lighting sets just to secure primarily electric lighting, he wants electricity pretty bad and ought to make a good consumer for a central station.

RUMORS

That 15,000 ampere-hour meters have been sold by a meter company to a manufacturer of gasoline farm electric lighting sets. This would indicate that the lighting set manufacturer had a definite field for these.

* * *

That if we include the power of horses and mules at the present time, the aggregate available horsepower on the farms exceeds that used in the manufacturing industries. A recent estimate of the available power used on the farm has been placed at 23,905,000 h.p. The 1910 census gives the total horsepower used in manufacturing industries at 18,755,286.

FACTS

State universities are giving farm mechanics a great deal of importance. Minnesota has just completed a building for agricultural engineering costing $250,000. Nebraska has an $85,000 building under construction. Iowa has authorized, in addition to its existing plant, a building to cost $150,000.

The University of California has recently acquired Prof. J. B. Davidson to direct the work of their Agricultural Engineering Division. A good deal of money is being spent in this direction.

All of these universities are giving "Electricity in Agriculture" special attention.

* * *

Electrical machinery, appliances and supplies sold to the farmers in California aggregate fifteen to twenty million dollars annually. Revenues to the central stations aggregate some millions of dollars yearly.

BENJAMIN FRANKLIN saved his money—so can you if you

BUY LIBERTY BONDS

The use of electric lighting in the barn is here illustrated, together with the ease which electric drive is applied to the needed machines. The idle belt shown just to the left of the motor goes down a pit back of the cutter where it operates a pump. When it is desired to supply water for irrigation or to fill the tank on the roof which furnishes the domestic water supply, it is only necessary to slip the belt from the cutter shaft and connect the motor to the pump. The electric bill for lighting is $1.00 a month, for power it averages $2.50 a month.

In December, 1915, a survey to determine the actual use to which electricity was being put on the farm developed the following:

Power Company.	Number of Installations	Total H.P. Connected
Company No. 1	760	8,669
" " 2	Estimated 642	6,418
" " 3	" 946	7,095
" " 4	" 582	5,820
" " 5	706	8,792
" " 6	1572	50,702
" " 7	140	1,714
" " 8	1700	50,000
" " 9	" 79	1,575
" " 10	1774	14,821
" " 11	" 550	13,000
" " 12	227	8,402
" " 13	316	6,209
" " 14	314	3,724
Approx. aggregate of miscellaneous small central stations	175	3,500
	10,583	190,441

This means in round numbers about 200,000 h.p., which represents approximately 12,000 motors. 80% of this, or 160,000 h.p., is for irrigation and reclamation; 20%, or 40,000 h.p., for miscellaneous purposes.

If this latter load is obtainable in such a widely scattered community as California, is it not possible that this character of load would be very much greater in a more densely populated community, with the result that the actual load per mile of line supplied by the central station might run almost as much as it does in California where irrigation predominates.

* * *

SUGGESTIONS

Electrical people should talk with the agricultural departments of the universities and should get acquainted with the young men learning to be farmers of the future.

By following the classes in agriculture at the universities, excellent mailing lists are obtainable. This is particularly true of the list of Short Course students at the University of California.

The County Farm Advisers should be known by the electrical people and the electrical industry should take upon itself the responsibility of keeping the Farm Advisers informed of the progress of the use of electricity on the farm.

CALIFORNIA AND ELECTRICITY

The State of California ranks high as a user of electricity. The individual Californian on the average uses electricity more generally than the people of our other States. This is surprising when one considers that this state has barely three million population, whereas in some of our Eastern States the principal cities alone have nearly an equal population.

The evidence of this condition we see on every side and is confirmed by the large sale of electric lights, electric appliances, electric ranges and machinery which are used about the home and farm. Our poorest people have electricity in their homes, a condition not to be found elsewhere. In New York City the poor we will find use the old kerosene lamp, with now and then a gas light in evidence, but never the electric.

This indeed is a wonderful condition. If the poor enjoy this modern convenience and servant, it naturally follows that those in better circumstances and well-to-do enjoy it more fully. That a very large percentage of California homes are using electrical appliances is evidenced by the following tabulation of approximate annual sales:

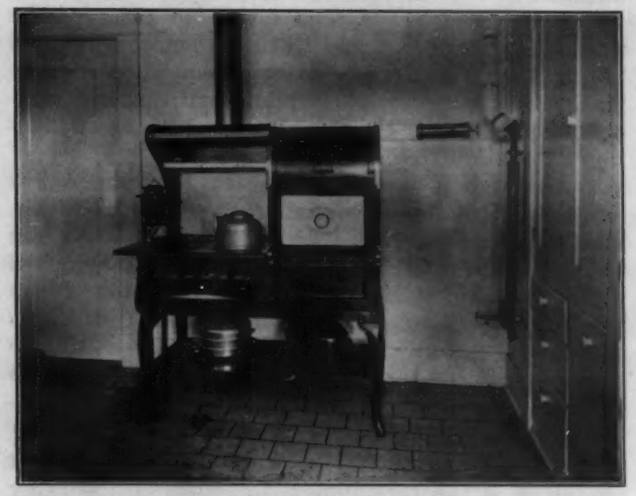
ANNUAL SALES IN CALIFORNIA

Electric irons	17,000	yearly
Electric toasters	2,700	"
Electric percolators, tea pots, etc.	6,700	"
Portable electric vacuum cleaners	5,500	"
Electric washing machines	5,000	"
Electric ranges—probably	1,500	next year

Little motors are purchased for driving sewing machines, etc.

The women folks in all walks of life have been quick to see the economic advantages and the convenience of electricity. In the kitchen, where heat is required in varying quantities throughout most of the day, the advantages of the electric range are rapidly being appreciated. The electric range can produce heat in any desired quantity, always under absolute control, and is much cleaner than any other method. The women on the farms seem to appreciate this even more than those in the city. This is probably due to the fact that during the summer time an electrical kitchen is much cooler than one

equipped with a coal or a wood stove, for the electric range applies its heat only within the oven itself or directly under the pot or kettle being heated, that is to say, there is no energy wasted by radiation and heating of the room.



INSIDE THE FARM HOUSE

An actual installation in a ranch at Sunnyvale, California, showing how the drudgery is taken out of farm work. With the range and a 3000 watt water heater, electricity bills average $5.75 to $6.00 per month.

Some time ago there were 1750 electric ranges in use in California homes. This phase of the business is barely in its infancy, and if in a couple of years the public sees its way clear to purchase this number of ranges which until recently have largely been in an experimental stage, it is not so difficult to imagine the enormous range business which is awaiting the manufacturer and which is to be done in the next few years.

The electric light and power companies are supplying thousands of horsepower for use in the homes. In our rural communities we have a condition equaled nowhere else in the world.

Adding to the foregoing the demand for electrical machinery in shipyards and industrial plants generally, we find the annual sale of electrical equipment in our State to be between fifteen and twenty million dollars. The industry has acquired a position in our life where we could not be without it. The telephone, the telegraph, the electric cars, and so on, have become absolute essentials, and are so much in demand that the telephone itself has been improved to the extent that we can now talk over a line more than 3,000 miles long, a reality which but fifty years ago was not dreamed of by even the most imaginative.

And to think that it is two natural advantages—our water falls and our oil fields—which make this possible, is indeed gratifying; but even more pleasing is the thought that man himself makes all this a reality and converts water and oil into this wonderful servant. The electrical engineer's foresight and daring and the electrical manufacturer's ingenuity have developed all the things to make the conversion complete and deliver this unseen electricity to the point of use.

THE ELECTRIC TRACTOR ON THE FARM

BY J. H. DAVIDSON AND F. E. BOYD

(More electricity is used on the farms of the West than of all the rest of the United States put together. The only branch of farm activities not electrically operated up to now, in fact, has been plowing and cultivating, and this report of an experiment carried on by a representative of the University Farm at Davis, California, and of the San Francisco office of the General Electric Company gives promise of the practical capture of this field. The article contains data recently published in the General Electric Review.—The Editor.)

With the rapid increase in the number of internal combustion motors and the pending scarcity of the more volatile petroleum fuel products, it is well that consideration be given to other sources of power. Hydro-electric power should at least receive careful consideration for all purposes where it can be used.

The advantages of electric power for field work, where the load must necessarily be irregular, are quite obvious. The simplicity and reliability of the electric motor is not exceeded by any other motor; much of the engineering is confined to the power house, and the ability of the electric motor to carry temporarily a heavy overload gives it a decided advantage for agricultural work where the load is constantly varying. The large starting torque, light weight, and compactness are likewise of importance in this service.

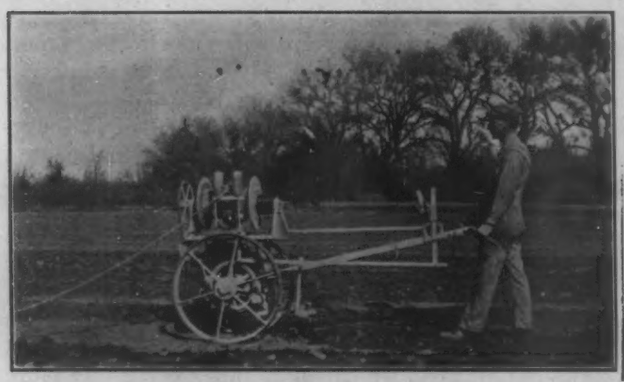
In California the use of electric power on farms for pumping, lighting, and general power purposes is now extensive. A survey made in 1915 by a committee of a Western power association indicated that the total horsepower in electric motors on the farms was in excess of 190,441, and by the beginning of this year the total was 200,000 horsepower. The total number of consumers was about 14,000. It is significant that this electric power exceeds the electric power used on all the rest of the farms in the United States.

At the present time water power in California has been developed to the extent of 600,000 horsepower, although fuel oil has been very cheap in recent years. It is stated upon good authority that the total available water power in the state is 6,000,000. It would, therefore, seem reasonable to expect an extension of the use of electric power on the farm in the future.

METHUSALEH lived a good many years—but some of our boys are finding an ideal better than life. Don't be ashamed to face them when they come home—

BUY LIBERTY BONDS

It is on farms where intensive agriculture is practiced and where electric power is now used for pumping, where the transmission lines are installed, that the field of electric power will be extended. Most



THE TRACTOR IN USE
A practical experiment which demonstrated the possibilities of electrical cultivation on a small scale

of these farms are either truck farms or farms producing crops of high value per acre. Although California is a state of large ranches, there are, according to the 1910 census, 43,139 farms of less than 50 acres, and 22,525 of less than 20 acres. Incidentally this land, as shown by the census, has an average value of $500 per acre. Thus it is seen that the farms of California could use a large amount of electric power without involving any serious transmission problems, and if its use were made possible it would not only replace much of the power now being used, but also reduce the amount of hand labor necessary.

In order to secure some definite data concerning the possibilities of electric power for field work the authors conducted an experiment which involved the following distinct features:

Design and construction of an experimental tractor.
Practical field test of tractor.
Tests to determine power consumption.
Analysis of results and conclusion.

The experiment was confined to the use of power obtained direct from a commercial transmission line, and storage batteries were not considered.

The tractor was designed for truck crop work. Two drivers were used with a cultivator as an integral part. It was designed to travel 140 feet per minute and was driven by a 3-h.p., 222-volt, 3-phase motor. The machine was made by utilizing parts of other machines as far as possible. The drivers were 32 in. in diameter, with a 4-in. face. Three speed reductions were required, which were effected by a belt, a bevel gear set, and a spur gear set. The machine carried a cable reel, and through the operation of a friction clutch the cable could be played out or wound up as desired. In operation the cable was dropped at the side of the tractor when traveling away from the main power line and picked up on the return. It was necessary to shift the cable connection at the end of the field occasionally by moving the plug connector to a new receptacle. The experimental machine, complete with 180 feet of cable and cultivating attachments, weighs 733 lbs.

The methods of cultivating the soil and distributing the electric power are illustrated in Fig. 1.

Conservative estimates made in collaboration with the power company engineers indicate that the poles and line material necessary for the installation outlined in Fig. 1, even at the present high prices, will not exceed $110. The estimated price of the machine is $500; thus, for $610 the equipment could be put on a farm ready to operate. These figures make liberal allowances for manufacturing and merchandising, and for the electrical man on the installation.

Although it is a fact that the equipment has limits on its radius of operation as compared with a horse (which, together with harness, would cost in the average of $275), it should not be overlooked that the machine is capable of doing many things that a horse cannot do. For instance, it constitutes a portable motor which can readily and easily be moved about the farm by one person to be belted to a wood-saw, churn, feed grinder, cider mill, grindstone, spraying machine, etc.

An important feature of an equipment of this character is the fact that it is capable of working

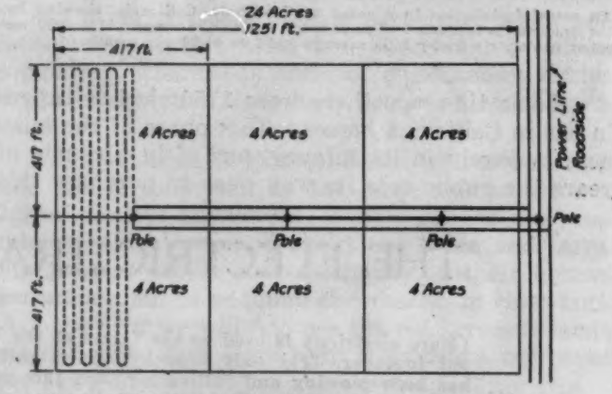


Fig. 1. Diagram showing Arrangement of Power Feeders and Method of Cultivating 24-acre Plot

continuously, where a horse can only work intermittently.

After construction, the experimental tractor was given a field trial. No difficulty was experienced in handling the machine, although it was not to be expected that the machine would be free from many impractical features. However, the machine worked better than the authors anticipated. The cable was easily managed, and the fact that the machine was tethered was not so much of an inconvenience as might be expected. It was unusual to find a machine working so quietly and with so much reserve power. The tractor in hard ground, where the cultivator was set deep, would slip its drivers while the motor developed an overload of 250 per cent.

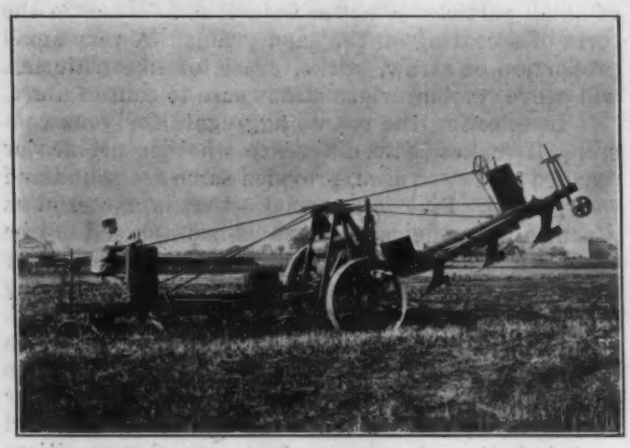
Records were made of current consumption, and the following data were secured:

Normal cultivation, current consumption, 1867 watts.
Deep cultivation, current consumption, 3200 watts.
Drivers slipping, current consumption, 3200 watts.
Recultivation on soft ground, current consumption, 2400 watts.
Cultivator on soft ground, current consumption, 2200 watts.

A draw-bar horse-power test was made by detaching the cultivator and substituting a stone boat for a load.

Draw bar pull, 2285 pounds.
Time required to travel 100 feet, 46.8 seconds.
Draw bar horse power, 0.88.
Input-electrical horse power, 2.94.
Over all efficiency, 29.8 per cent.
Estimated output of motor, 2.48 h. p.
Efficiency of tractor, 35.5 per cent.

The efficiency of the outfit was very low. This can be attributed to the crude gearing used and the excessive friction of the bearings, which were not in the best of condition.



WORKS BOTH WAYS

One of the European types of electrical plow which may be reversed without turning it around and thus complicating the cable connection.

It was noted during the tests that the slippage of the drivers while doing normal work was 2.9 per cent; also that while reeling the cable the power consumption was less than when playing it out. This was due to the fact that the pull of the cable assisted in moving the tractor, while when unwinding there was a drag due to friction in the reel.

The following conclusions were deduced after the completion of the tests:

(a) It was demonstrated by a crude experimental machine that the soil could actually be cultivated by electric power and that at least there were no fundamental obstacles.

(b) For garden work a light machine is desirable, keeping the power consumption low and making the machine easy to handle.

(c) The overload capacity of an electric motor is an important feature in its favor.

An effort has been made to compare the cost of cultivating and plowing by a horse and with this machine. It is very difficult to draw any accurate conclusions because there are so many varying and intangible factors entering into the maintenance of a horse equipment. The following approximations, although not suitable from which to draw any definite conclusions may, nevertheless, be of some general interest.

First. Due to the greater rate at which work can be done and the continuous period over which it can be performed, it is believed that where it would take a horse about 11 hours to cultivate 8 acres (the work, of course, not being done in 11 consecutive hours), the machine could do the same acreage in possibly 8 hours (there being no question about the fact that it could be done in 8 consecutive hours). This means efficiency in the use of labor incident to operation.

Second. Although, as stated above, the cost incident to the maintenance and operation of a horse equipment is very uncertain, estimates indicate that in the cultivation of a 24-acre tract, as illustrated, there would be at least a saving of $7.50 for each cultivation in favor of electricity, plus at least a day and a half in the time saved by the person operating the equipment. Opinion differs as to the number of cultivations necessary for different crops, but, of course, the more cultivations the greater the saving.

Third. It is interesting to consider what the use of this outfit will mean to the farmer with property under 40 acres, taking into account the question of how much acreage is necessary to provide pasturage and feed for horses. Any saving in this direction means a transference from the expense account to the income account.

Fourth. Expenditures for feed for the horse should not be overlooked in considering the cost of operation.

In conclusion, it is apparent from the fact that 200,000 h.p. in electric motors is now actually being used on the farm that the phrase "Electricity on the Farm" does not constitute an idle dream any longer.

ON A LARGER SCALE

Elsewhere electrical plowing has been done with a heavy machine on a larger acreage—but the interest of these western experiments lies in their demonstration that the small farm can afford to make us of the electrical plow.

Although 160,000 h.p. of this is used for irrigation and reclamation purposes (a peculiarity in semi-arid regions, the remainder, or 40,000 h.p., is actually being used for miscellaneous farm purposes, such as were enumerated in connection with the varied uses to which the machine in question could be put on the farm. The only thing that we are not doing with electricity on any scale is plowing and cultivating, and this now bids fair to be a commercial reality in the very near future.

THOMAS EDISON has invented many things but none so powerful toward winning the war as an oversubscribed Liberty Loan—

BUY LIBERTY BONDS

CONCRETE ON THE FARM

BY J. B. MARCELLUS

(Electrical installations on the farm are usually accomplished by the use of concrete—a concrete floor for the pumping house, a reservoir for the irrigation system, a foundation for the lighting plant. Not only is the electrical man interested in the details of this necessary adjunct to his product, but he finds much use for concrete about his own place of business and will appreciate these practical suggestions from the engineer in charge of the division of college extension of the Kansas State Agricultural College.—The Editor.)

The Selection of Materials—

The farmer should see that his cement is received in good condition. While cement is sold by the barrel, it is delivered in sacks, four sacks being considered one barrel. One sack is also considered equal to one cubic foot. Do not pile your sacks of cement directly on the ground, but on boards supported above the ground, so as to provide an air space to prevent drawing dampness. If stored in the open, a waterproof cover supported on boards to prevent direct contact with the cement sacks should

CONCRETE IN USE

Everywhere the use of electricity and concrete on the farm are joined. Concrete silos filled by electrically run feed cutters, concrete dams for storing the irrigation water, concrete barn floors and electric lights. Here the concrete forms the base for the motor which pumps the water for irrigation.

be used. Do not pile the cement directly against the wall, but always have the free circulation of air on all sides of the cement. Dry lumps in a sack of cement are not detrimental, as they will readily break up, but lumps caused by the cement being wet should be thrown out. Save the sacks, as they are worth 10 cents each. The color of the cement is not an indication of its quality. It is not possible for the farmer to test the cement, and he should therefore buy only brands which have an established reputation.

The Character of the Sand—

In selecting your sand, only coarse, clean, well graded material should be used. Fine sand requires more cement than coarse, well graded sand. It is necessary that there be sufficient cement to coat all the particles of sand, and to fill the voids between the sand. If you cut an apple in two, you have more surface than before the apple is cut; so if you have a fine sand, you have more surface to coat than with a coarse sand. It used to be considered necessary that the sand should be sharp or angular. Tests show that this makes little difference, and that rounded grains will make as satisfactory mortar as angular grains. A small amount of clay which is in the form of small particles is not as injurious as when in the form of a coating on the sand grains. A very small proportion of straw, sticks, grass, or like materials will prove very injurious and is sure to cause failure.

In selecting the coarse aggregate for your concrete, it makes little difference whether pebbles or crushed stone are used, provided same are sound and well graded. Pit-run material,—that is, material as it comes from the sand or gravel-bed—should not be used, but should be screened and mixed in proper proportion. It is economical to do this, as nearly every gravel pit will have an excess of fine material. For ordinary construction on the farm, these pebbles should vary in size from one-fourth inch to two inches on their largest dimensions. If a thin wall or slab is to be constructed, even smaller gravel will work to better advantage. As a general proposition, walls less than four inches in thickness are seldom used for farm structures.

The Proper Proportions—

The proper materials being selected, the next thing for consideration is the proper proportions. A mixture of one part cement, one and one-half parts sand and three parts pebbles or broken stone is considered a rich mix. This should be used in the construction of tanks, troughs, driveways which will receive hard service, thin walls, roofs, and various other uses where the strain or wear will be quite severe. A mixture of one part cement, two parts sand, and four parts pebbles or crushed stone is a good mix, and can be used for a large majority of the structures around the farm such as floors, beams, silos, walls and engine foundations. A mixture of one part cement, two and one-half parts sand and five parts pebbles or crushed stone is a fair mix, and should be used for footings, foundations, backing, and other places where a high tensile strength is not required. A mixture of one part cement, three parts sand and six parts pebbles or crushed stone is a lean mix, and should be used only in unimportant work or where mass only is desired. A 1:2:4 mix is about 50% stronger than a 1:3:6 mix, and a 1:1½:3 mix is about 100% stronger than the 1:3:6 mix.

The Mixing—

There is one ingredient that I have not yet mentioned, and that is the water. Do not make the mistake of using too much water, or substitute the same for elbow grease in mixing. You will find that the use of about 6½ gallons of water to a sack of cement will give you about the right consistency. The wetness, however, of the sand or pebbles will of

course effect the quantity of water required. A mushy, liver-like consistency will give you the most efficient concrete.

In mixing concrete by hand, it is always best to have a measuring box at hand. One holding about four cubic feet will work to the best advantage, especially if you are using a 1:2:4 mix. Have a mixing board which is water-tight, so that you will not lose the cream of your concrete by seepage. First spread over the mixing board a layer of sand about three inches thick, then spread the proper amount of cement. Turn this dry at least three times or until all the streaks have disappeared, then put on the stone and wet. Do not use a hose for the water, but use a bucket and use the same amount for each batch. The entire mass should then be turned at least three times, or until of a uniform color. Use short handled shovels. Deposit within 30 minutes after the water is applied. Have the mixing board as near to the place of use as possible. Avoid long hauls in wheelbarrows or wagon, as this tends to separate the materials. In placing in a wall, the sides should be spaded so as not to leave pockets or honeycomb places. In ordinary summer weather the concrete should not be disturbed for at least three days, and preferably longer. If in an exposed location, it should be covered and kept for at least ten days. Warmth and moisture are the best curing elements for concrete.

Machine Mixing—

I have said nothing regarding machine mixing. The individual farmer will seldom have enough concrete work to require the investment in a mixer. If he has a job larger than he can handle satisfactorily himself there is usually a contractor with machine within range. See that the contractor brings a batch mixer and not a continuous one. Continuous mixers are prohibited by 99% of the specifications because of lack of uniformity in resulting mixture. It is also advisable for the farmer to furnish the concrete materials as he can get them as cheap as the contractor and the temptation to skimp is eliminated. In mixing concrete by machine it should be kept in the mixer at least one minute after all the materials are in the machine. The mixer should revolve at a speed of 12 to 18 revolutions per minute.

The Forms—

In making forms, use green timber, as this will not swell and injure the concrete where wet. The bottom of your walls should be well placed, because the concrete when fresh exerts a strong pressure. Concrete weighs about 150 pounds per cu. ft. If the forms are to be used frequently, it is well to oil them so that they can be readily removed, and the concrete will not stick to them. The leaner the mix, the longer the forms should be left in place.

In placing the concrete in freezing weather, it is preferable that all the materials be heated and the concrete protected from freezing after being put in place. Salt is sometimes used as a preventative in freezing, but this is not effective much below 28 degrees F. and will frequently leave an efflorescent surface. A 3½% solution of calcium chloride is more successful, as it causes a chemical action which generates heat.

You are doubtless all more or less familiar with reinforced concrete. In placing the reinforcement, always remember that the steel is used to withstand the pull or strain. The working strength or pull of steel is usually considered as 16,000 lbs. per sq. in. Concrete is comparatively weak in tension, but strong in compression. Two inches of concrete is ample to protect reinforcement from fire, water or other elements. In making reinforced slabs as for bridges, or spans of any kind, which will support weight, the reinforcement would of course be placed near the bottom. At the Kansas State Agricultural College one of the laboratory lessons for the classes in concrete is to make four beams about six inches by eight inches, and 6½ feet span. In one of these beams there is no reinforcement. In another beam the reinforcing is placed two inches from the top, and in the third beam, the reinforcement is placed in the center and in the fourth beam it is placed near the bottom. After 28 days these beams are broken, and the results noted. The beams without the reinforcement will usually support a load of about 750 lbs. The beam with the reinforcement in the top will support but little more or about 1000 lbs. The beam with the reinforcement in the middle will support about 5500 lbs., and the beam with the reinforcement in proper place near the bottom, will support 9000 lbs.

Practical Application—

One of the first things the farmer builds of concrete is a sidewalk, and it is usually around the kitchen door. His good wife appreciates the difficulty of trying to keep the kitchen clean when the men folks track in dirt from the barnyard. This sidewalk should be four inches thick and made of a mixture of 1:2:4. The surface should be floated with a wooden float and if a trowel is used the surface should not be polished and left slick. Smooth so as to be easily cleaned, but not slippery.

About the time the walk around the kitchen door is completed the garage needs a floor and the same materials and methods are used there. A little more trowel work, perhaps, in the garage floor, as this is protected from snow and ice.

The front steps and perhaps the front porch floor are getting rotten, so we use some more 1:2:4 mix. By this time the farmer is in better practice and gets a better finish—a little smoother job.

The feeding lot gets pretty muddy so a feeding floor is built. This is built to allow drainage at one corner but a low curb is built around the edges to prevent the hogs from wasting the feed. A manure pit, a root cellar, a water trough, fence posts, corn crib foundation, dipping vat, hog wallow, dairy barn floor, silo, milk vat, cellar steps, ice house, duck pond, chicken house, tree cavities, pig troughs, septic tank, and a hundred and one other things are eventually made of concrete.

GOLIATH didn't believe David could lick him until he finally got the thing into his head. Watch the Germans when it strikes them America is in earnest.

BUY LIBERTY BONDS

PROPOSED EXTENSION OF DAYLIGHT SAVING TIME

BY W. G. VINCENT, JR.

(That the clock should again be placed back to its normal hour on October 27, 1918, according to the provision in the present law, leaving to localities where power shortage exists the option of change in time of operating their industries is herein urged by the author, who is valuation engineer for the Pacific Gas & Electric Company and a well-known authority on the economic analysis of large and complicated electric power loads.—The Editor.)

Consideration is now being given to the advisability of extending the so-called Daylight Saving Time throughout the entire year, instead of reverting to the old standard time on October 27, 1918, as was originally planned. This extension of Daylight Saving Time is a matter which should be determined only after carefully weighing the advantages and the disadvantages to the country as a whole and, as in all other matters in these days, this question should be and undoubtedly will be considered primarily in its relation to the prosecution of the war.

The following table which gives the standard time of sunrise and sunset on the 15th day of each month in San Francisco and also the total hours between sunrise and sunset will be found helpful in considering the effect of the change of time for the five months, November to March inclusive.

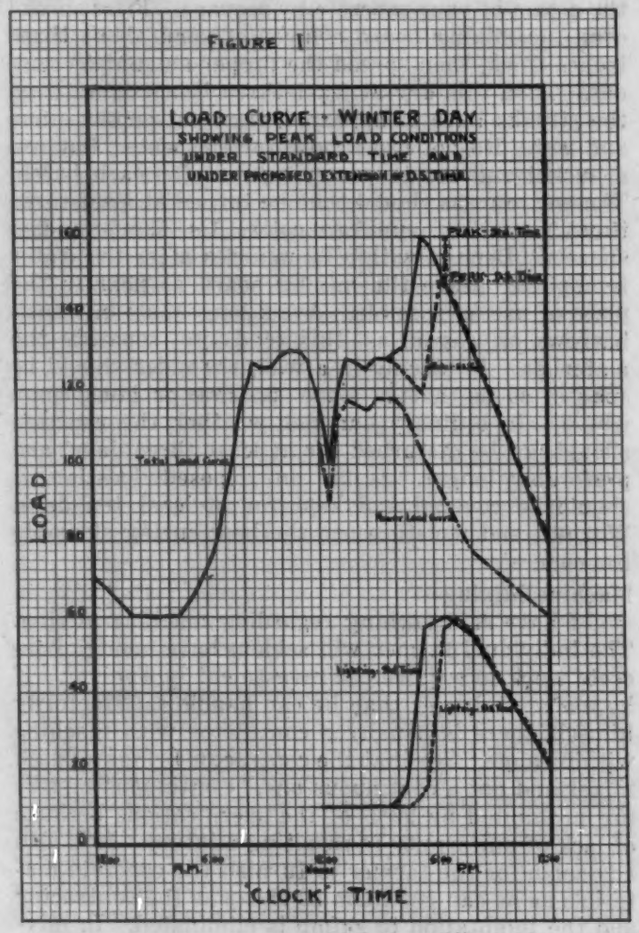
DAYLIGHT SAVING NOW IN EFFECT	Time of Sunrise (Standard Time at San Francisco)	Time of Sunset (Standard Time at San Francisco)	Hours between Sunrise & Sunset
April 15	5:35 a.m.	6:45 p.m.	13:11
May "	4:59 "	7:13 "	14:14
June "	4:46 "	7:34 "	14:48
July "	4:59 "	7:33 "	14:34
Aug. "	5:25 "	7:04 "	13:39
Sept. "	5:52 "	6:19 "	12:27
Oct. "	6:19 "	5:33 "	11:14
Average for D. S. Period	5:25 a.m.	6:52 p.m.	13:27
DAYLIGHT SAVING NOW BEING CONSIDERED			
Nov. 15th	6:51 a.m.	4:58 p.m.	10:07
Dec. "	7:19 "	4:52 "	9:33
Jan. "	7:25 "	5:14 "	9:49
Feb. "	7:00 "	5:48 "	10:48
Mar. "	6:21 "	6:17 "	11:56
Average, Proposed D. S. Period	6:59 a.m.	5:26 p.m.	10:27

It is evident that there is on the average over three hours more of daylight per day in the first seven months than in the last five months, the average being greater than three hours because of the greater length of the dawn and twilight periods in the summer months.

It will be noted that the average time of sunrise for the first seven months is at 5:25 and the average time in the second five months is approximately at 7:00. Thus persons who normally rise at 6:30 by the clock gain an hour more of daylight under the April to October Daylight Saving Time, but from November to March this would not be the case, as they are getting up at dawn, or about one-half hour before sunrise, by standard time and by the Daylight Saving Time during that period they would be getting up an hour before dawn.

The effect on the evening relations with the sun would be to make our relations on the shortest days of the year in December under the Daylight Saving Time what they have heretofore been on the first of October under standard time.

The two conditions may perhaps be best visualized by considering the daylight conditions on an average day of the November to March period for an individual rising at 6:30 and working from 8 a.m. to 5 p.m.



The probable effect of an extension of the Daylight Saving Law

		Conditions Under Standard Time	Conditions under Daylight Saving Time
Rising at	6:30 by clock	½ hour before sunrise rather dark but soon becomes light.	1½ hours before sunrise—dark.
At work	8:00 " "	1 hour after sunrise—light.	Sun just rising—light rather weak.
Stops work	5:00 " "	½ hour before sunset—light.	1½ hours before sunset—light.
Dinner	6:30 " "	1 hour after sunset—dark.	Sun just setting—soon becomes dark.

This indicates that no better utilization of daylight would be achieved under Daylight Saving Time except for those working after 5 p.m., the evenings being dark in either case and under the Daylight Saving Time the mornings would be dark also.

As to the effect on the operations of electric utilities, the greatest benefit is to be looked for in the reduction of the peak loads on the short days in November and December between 4 and 6 p.m. These peaks are with many utilities that supply general service in congested centers the maximum peaks of the year and are due to the overlapping of the day power load and early evening lighting load. By shift-

ing the lighting portion of these peaks one hour later by the clock it would be superimposed on a smaller power load and the combined peak would be reduced. This may be understood more clearly by studying the typical load curve in Figure I, which indicates that at the time of the lighting peak the power load is dropping off very rapidly, as is to be expected between the hours indicated above, and the shifting of the lighting load places it farther down the slope of the power load. This reduction of the peak, as before stated, is the principal effect which may be expected on the operation of electric utilities, and the desirability of extending the Daylight Saving Time will largely depend upon how far this change is a benefit. In other words, if this reduction of peak at this time of the year will reduce the amount of power plant capacity that it is necessary for a utility to have to take care of a given amount of service, then the benefit of the Daylight Saving Time can be directly measured in the saving of fixed charges on this reduced capacity. If, on the other hand, this reduction of peak does not permit of reduced capacity because of the class of load which the utility is supplying and the fact that at some other time of the year, and possibly in the daytime, peaks occur in excess of or equal to those that occur in the November and December period under the Daylight Saving Time, then there would obviously be no saving in plant capacity.

There will be a very material increase in the use of electric lighting in the morning hours under the proposed plan; just how extensive this increase of power for lighting in the morning will be is difficult to determine. It is, however, actually maintained by some utilities operating large industrial loads that under the proposed plan their morning peak will exceed the peaks they have had in the evenings heretofore by a very material amount. This, however, is not the general condition, as practically all electric utilities supplying a diversified light and power load anticipate that the reduction of the evening peak would be much greater than the increase in the morning peak and that there will be a substantial reduction in the average energy used per day for lighting. This reduction in lighting will not be as great in the residential use as was caused by the change of time in the April to October period, but nevertheless will be a substantial reduction. In the case of energy for commercial lighting, on the other hand, a greater reduction may be expected in the November to March period than was experienced in the April to October change.

The reduction in the amount of energy required will result in the saving of fuel where energy is generated from that source. On the other hand, it will also reduce the revenue of the utilities supplying the service, the reduction in revenue which will result being many times greater than the saving in fuel, even where all of the energy is obtained from that source.

It is evident, therefore, that the present extension of the Daylight Saving Time throughout the year would mean that whatever net losses the utilities sustained in the way of revenue would have to be made up in the rates paid for the balance of the energy sold. In other words, under a condition of regulated rates this loss should not fall on the utility but should be made up by the consumers using the energy actually used. There would, however, be a net saving to the consumers as a whole of an amount equal to the fixed charges on the power plant capacity which the Daylight Saving Time caused to be unnecessary to supply the load and the cost of fuel saved. This is, of course, considering the case of a growing load, as obviously where the plant is already installed and the load not growing there would not be any reduction in fixed charges.

All references to time in this discussion have been for San Francisco conditions. This is a very important factor as this country is divided into four "time zones" and communities in the eastern portions of these time zones have what is called a "slow clock" and those in the western portions a "fast clock."

In summarizing the merits of the proposed plan it may be said that the principal advantages would be (1) the release of a substantial amount of power plant capacity during the coming winter, caused by the increase in diversity between the lighting and power loads, (2) some reduction in the amount of fuel used for producing electric energy, and (3) the extended utilization of daylight by those working after 5 p.m.

On the other hand, the principal disadvantages are (a) an unsatisfactory and inconvenient daylight condition in the morning hours for a large majority of people and industries, (b) a probable increase in the use of fuel for heating made necessary by earlier rising and earlier opening of industrial plants, stores, offices, etc.

A general review of the opinions received from a large number of prominent utility operators throughout the country seems to indicate that in most cases there would be a substantial reduction of the winter peak and also in the necessary plant capacity to supply the community, and in many cases this would make the available plant capacity much needed to supply essential industries. A great many of the companies would be benefitted very slightly and the reduction in their revenue would be quite material. There is a very strong opinion that the change will not be satisfactory to the public and the disadvantages more than out-weigh the advantages. A number seem to feel that while in their localities there will be no material benefit, it may be justified as an emergency measure by conditions elsewhere.

On the whole it would appear that a general change is not advisable and possibly that the best solution would be to create the desired diversity between the light and power loads in those localities where a power shortage exists by a change in the time of the operation of power using industries, rather than by changing the clock.

GENERAL PERSHING is no more responsible for this war than you are—

BUY LIBERTY BONDS

MRS. O'HOOLIHAN ON THE LIBERTY LOAN

"THE CAUSE AV THE WAR," said Mrs. O'Hoolihan, wiping her hands on the roller towel and starting the electric wringer, "was due t' a misunthersthandin'. Wud the whale av swallied Jonah if he cud av sane he was comin' out on top in th' ind and no improvement t' his indiejeshtun? He wud not. And no more wud th' kaiser av orthered cramed chicken and a botthle av fizz wather in Paris f'r his Christhmus dinner foor years ago if 'twere not he ixpected t' surround the Frinch ar-rmy with a delegation av thray sar-rgints and a private with wan hand whoile houldin' the British navvy in th' shtrates

Wishing the kaiser would be run over by an automobile is no way to end the war—nor is it the acid test of a patriot. Patriotism consists in paying the bills of your citizenship, not cursing the Bills of theirs.

of Dover with a motor boat and a diplummat with th' other. As fer Amerriky, Mrs. Casey, whut with th' most av the U-nithed Shtates bein' bor-rn in Germunny—loike mesilf, Mrs. Casey — the kaiser was anty-sippatin' no thrubble. Whoi for shud annywan live in a r-repubthlic annyway ixcipt fer th' money in it? he sez. And who wud pay fer an Amerricun ar-rmy, Mrs. Casey, not t' mention foightin' in ut? sez he. Be token av which, Mrs. Casey, oi'm investin' in th' Libberthy Loan. 'Tis an adhvertoisemint.

"AND WHIN TH' BUR-RGOMISTER av wan av thim haythun towns rades about ut in th' mornin' paper, Mrs. Casey, ut will be telygraftin' t' Austhria he'll be doin' to' get out a new pace note. "'Tis impossible,' sez the Pharo-ahs av Agypt, whin Moses stharted doin' sloight av hand thricks with a rabbit and an impthy hat, but whin th' grasshoppers began atin' thim out av house and home, the Agyptians began doubtin' did th' imperor see through th' thrick. 'Tis a belavin' payple, the Ger-rmuns, Mrs. Casey, but whin the wather shtarts comin' in th' sicond shtory windies, 'twill take few argymints t' convince thim 'tis a wet winther.

"BUT IT TAKES MORE THAN HAND CLAPPIN' t' be hear-rd across th' oshun, and wishin' th' kaiser wud be r-run over be an attymobile on his way home from buyin' the last car-rload av ir-run crosses is no way t' win th' war. The felly that putts up a flagg in his front windy and phays a dhollar t' the R-red Cross be the raison he thought 'twas th' mail man and had no toime t' git out the back door may have moighty little roight t' shtand up whin they shtart playing th' Shtar Shpangled Banner. Manny's the woman that calls her naybur a pr-ro ger-rmun, Mrs. Casey, that finds hersilf onable t' subscr-ribe to the Libberthy Loan owin' that she's just bought a talkin' machane.

"BEIN' A PAYTHRIOT manes payin' yer bills—whether 'tis votin at th' prim'ry iliction or gittin' measured fer a uny-for-rm. And th' bill fer this war, Mrs. Casey, was not adthressed t' the felly that happuned t' have good oyes and no childer and a hilthy complecshun. He's payin' his share av it all roight and more—but ye've no call t' ask him for char-ruty. 'Tis an axident ye were bor-rn tin years too soon and a famale as will, or 'tis wersilf moight be dhrawin' yer thirty dhollars t'day with the bullets whisthlin' past ye. And ye'd be lucky at that, Mrs. Casey, for 'tis the rist av us will have th' har-rd work kapin' up with the boys. 'Twus in recog-nishun av th' fact that th' felly with th' weak heart has no fair chance at th' paythriot bizness that the guv'r-rnmint thought up th' Libberthy Loan. 'Tis not oft-ten ye git th' chance loike this wan, Mrs. Casey, av showin' ar-re ye a Amerrikun and 'tis a gr-rand falin'

When the flood begins rising on the slopes of Ararat is no time to begin asking how much the ark cost. You can afford to buy Liberty Bonds, according to Mrs. O'Hoolihan, because you can't afford not to.

ye git from doin' yer dooty. Not t' mintion, Mrs. Casey, th' monney ye save painliss.

"CAN OI AFFORD IT, ye're askin? Whin the r-river shtarted roisin', on th' shlopes av Ar-r-rat, Mrs. Casey, wud ye be askin' me cud oi afford t' pay me share av th' ark? Ye wud not. Ye cud spind th' monney fer other things, av course, but 'tis little use a new carput or a photygraft av the family wud do ye if th' house was on foire and th' wather supply tur-rned off be raison av ye being behoind with th' bill. 'Tis a quare thing, this affordin' ut, Mrs. Casey—and there's some folks can't afford t' pay the'r grossery bills becuz av the ixpinse av the'r attymobile. There is two dirictshuns t' ivery r-road, Mrs. Casey, and the quistion is not allways can ye afford t' go wan way, as ye can't afford t' be going' th' other. The lads in the thrinches ar-re payin' more ivery day than th' proice av an ixthry over-rcoat or ice crame on Sundays," said Mrs. O'Hoolihan. "And oi'll not be sayin' they can't afford ut, nayther."

WHAT MR. GOODWIN WOULD DO ABOUT IT

BY W. L. GOODWIN

(An answer to a few of the questions which still bother the contractor-dealer today — by the man who probably has done more for the contractor-dealer movement than any one other individual. The responsibility is laid, not only upon the retailer but squarely at the door of the jobber as well.—The Editor.)

The general answer to almost all the problems of the Industry is that, under proper leadership, the contractor follows the policy of the jobber. If the jobber has solved any of the problems, the same solution will serve the contractor. I take it that he has not.

First—Trade Acceptance. If the jobber will insist upon the acceptance, even where the payment is to be made within a thirty day period, the contractor will immediately follow suit. A contractor can take an acceptance for installation work including labor. This has been definitely ruled upon by the Federal Reserve Banks' governor in this section, confirmed by a similar ruling from Washington. There are so many advantages in favor of trade acceptances, I take it, that you do not want a discussion on these points. I would, however, be glad to give you a list of some fifty or sixty publications covering every phase of the subject. There is one danger about trade acceptances that should be avoided and that is the tendency to extend longer terms or expand the amount of credit. This is not the purpose of trade acceptance. Its only object should be to convert idle accounts receivable to active working capital. The jobber must set the way for the contractor.

Second—Advertising. Again the jobber is deficient in this respect. Where you find a live jobber who advertises, this serves as an argument with the contractor. Cleveland is one city in which the contractors regularly advertise in the local papers and the large number of high class retail stores in that city is the answer. Of course there are other factors which enter, such as favorable trade relations. Contractors should be educated to set aside from one to three per cent of their gross sales. Where newspaper advertising is to be indulged in, they must have help in the composition of the advertisements, as much money has been wasted by poor or ill-timed copy; in other words, that not tied in with manufacturers' ads. I believe an analysis will prove that the contractors in proportion to business have spent money far in excess of the average jobber's expenditures. The trouble is he does not prepare a budget and much of his expenditure goes into non-productive channels, such as programs, bazaars, questionable charities and similar channels. The contractor should be told the difference between advertising and contributions to other sources. It is a big subject and one little understood by the contractor. To get them started, I would strongly urge cooperative advertising. It is practical and productive and leads to individual advertising.

Third—Lack of Capital. Again the jobber should lead the way. First, by conducting a policy which will permit of the contractor earning a sufficient return to attract new capital, or to finance his temporary requirements through the customary channel of his bank. I think the contractors should be urged to incorporate their companies; selling stock to their employes under an agreement through salary deductions. The use of trade acceptances will also release idle capital on the contractors' books. The contractor should inaugurate a system of cash discounts, even to the extent of contracts or other work involving labor. They offer no inducement to their clients for prompt pay, hence are obliged to wait perhaps on an average of ninety days for their money. The system is wrong and should be changed. A discount might even be allowed on trade acceptances, not however equal to a cash settlement, and the period of acceptance should in no case extend beyond the lien date. Since there are so many employes of central stations, jobbers, and others connected with the industry, who either through lack of opportunities or insufficient return, cannot or do not invest their money with central stations and jobbers, they might be urged to invest with contractors. While the investment is not as secure, it would produce a higher rate of return consistent with the risk. Publicity through the press would help in this direction. Jobbers particularly should not object to their employes so investing, particularly if no opportunity is offered for investment with their employers. If people in the electrical business are forbidden the privilege of investing in their own industry how can we expect the dear public to do so? Most of the larger contractors in the east have a broad list of stockholders including many of their clients.

Fourth—Bolsheviki Spirit. I know this to be a fact, but can assure you that the contractor of the West has much to learn from the jobber of the East, particularly the New York and Chicago groups. In fact, the eastern jobber, as I have come to know him, plies his methods with the aid of a drum corps; whereas his more experienced brother uses an equally vicious method of secret diplomacy. The result to the industry is the same in both cases. Usually the jobber is not willing, and in any event, does not take the same chance in getting business on the merits of the service rendered as he expects the contractor to do. To succeed, he must have absolute protection in the form of a differential without regard to whom he sells. The moment the jobber recognizes this situation—and grant you, I am not disputing the fact that the jobber is entitled to this protection—nevertheless when he employs the same policy in selling that he does in buying, the Bolsheviki spirit will disappear from the contractor divis-

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CHRISTOPHER COLUMBUS discovered America but apparently the fact still needs disseminating among the Germans.

BUY LIBERTY BONDS

ion. The tendency of contractors to fail to respond to the pleadings of the central stations is perhaps the fear that they will involve themselves and the central stations will not see them through to the finish. If, however, the jobbers would take some action in the form of a resolution, similar resolutions could be put through the contractors' association.

Fifth—Open Meetings. Have the jobbers inaugurated this policy? When they do, the contractors will quickly follow suit. I understand that the National Jobbers' Association will hold open meetings at their next national convention but they will still have an executive session, as well as all sessions of the executive committee being closed meetings. It is not fair to ask the contractors to throw their meetings open to jobbers and others when the other groups who should take the lead refuse to do so. I have sat in jobbers' meetings for perhaps seventeen years and I could take an oath that nothing has ever transpired but what the result would have been better had the meeting been an open one. Certainly the jobbers have much to learn in this respect. If they do not voluntarily open their meetings, the time will arrive when they will have no meetings at all; because of the personal nature of co-operation on the coast, they may perpetuate their present policy longer than in other sections. The principle, however, is wrong, and certainly retards development.

WHY KEEP BOOK ACCOUNTS

(The Government writes to the electrical contractor-dealer through the Journal of Electricity, pointing out the necessity of a clear system of book accounts. Not only will it simplify your tax report, but it will enable you to increase the efficiency of your business as a war time duty.—The Editor.)

Bureau of Internal Revenue,
Washington, D.C.
September 14, 1918.

To Retail Merchants:

The Revenue Act now pending in Congress is expected to produce $8,000,000,000. This means a tax on the average of more than $76 for every man, woman and child in America. The average per family is nearly $340.

In many businesses taxes will be one of the largest items of expense. It is of the utmost importance, therefore, that every concern in business, large or small, whether corporation, partnership or individual, shall maintain an exact record of its receipts and expenses, in other words, keep accurate accounts. Taxes should be considered as an expense of the year for which they are assessed rather than for the year in which they are actually paid and the necessary reserves should be provided for at once.

Because of the large amounts to be collected, the Bureau of Internal Revenue will be compelled to check the income tax returns filed by taxpayers more closely than heretofore. The retail merchant who is able to place before the Internal Revenue Inspector book records showing exactly how he arrived at his statement of net income will greatly facilitate the Government's task of collecting the war revenues and save himself annoyance and expense.

No special system of accounts is prescribed by the Internal Revenue Bureau but the books should show in detail inventories, purchases, sales, capital investments, depreciation, and similar items required in making up the income tax return. Every merchant should study the income tax law and regulations and see to it that his accounts are kept in a manner that will enable him to determine his net income for taxation purposes.

Aside from the necessity of keeping systematic accounts in order to comply with the Government's requirements, every progressive merchant should adopt an improved accounting system for the good of his own business. In no other way can he further his financial interests more effectively. It has been proven time and time again that accurate accounts are absolutely essential to success in business. The merchant who has a good accounting system is able to eliminate waste and unnecessary expense and can so control his purchases and his credits as to greatly lessen the chance of failure. The inventory, which cannot be taken without some form of accounts, is the compass of a business. Without it the direction in which the business is heading either for success or failure cannot be determined.

In the complexities of modern business, costs must be calculated with certainty in order to determine what the selling price of an article should be in order to yield a reasonable profit. This is impossible without books of account.

The profits of a business or the losses of a business cannot be determined without book records; and now that the Nation requires every citizen to contribute to the war budget within his means of income, the returns required by the Government under the revenue laws cannot be made with any degree of accuracy without books of account and annual inventories.

The bad debt loss of the Nation, which runs into large figures annually, is due in large measure to inexperience and inability. If merchants would keep even the simplest books of account the bad debt wastage would be reduced materially, for inability and inexperience are usually marked by the absence of an accounting system.

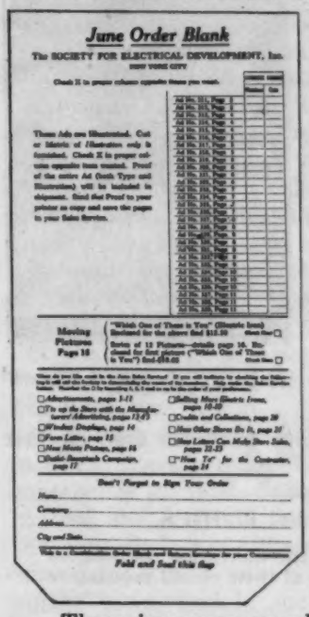
Owing to the withdrawal of man power from industry it is essential that every business man be more frugal and exert himself more effectively to conduct his business efficiently.

The man who knows the exact condition of his business from day to day has an immeasurable advantage over the individual who has no records upon which to base his operations. It is the duty of every citizen especially in these war times to keep in such close touch with his business through record keeping and otherwise as to maintain the greatest efficiency and render to his Government every cent due in taxes.

DANIEL C. ROPER,
Commissioner of Internal Revenue.

Western Ideas

A COMBINATION ORDER BLANK and envelope is suggested by the the inserts sent out by the Society for Electrical Development, Inc., each month. This consists of a long slip of paper 5¼ by 11 in., on one side of which is printed the order, on the other, in the proper place when folded, the return address of the society. One end on the printed side is shaped to a flap and gummed across the edge. This is so designed that when folded in the ordinary manner of a letter, the flap folds neatly over to the back, leaving the address on the face, ready for the stamp.


June Order Blank

The SOCIETY FOR ELECTRICAL DEVELOPMENT, Inc.
NEW YORK CITY

Fold and Seal this flap

There is no reason why a similar idea might not be used by the dealer in connection with mail campaigns. The letter form permits of a great deal more information being included than would be possible on a return post card., often saves the necessity for adding extra literature, thus reducing printers' bills and interests the householder who experiments with the slip of paper to see how it will fold.

FINANCING WIRING WORK is one of the problems which confronts the contractor who may be doing a large business on a small capital. Contractors needing funds to finance wiring jobs have often secured them in the following manner:

When the job is secured and a contract signed the contractor goes to his local bank. The contract form stipulates that the house-owner shall pay the bank in monthly installments when due.

The contractor transfers his right to collect the money from the house-owner to the bank, receiving in return 50 per cent of the amount of the contract immediately from the bank in cash and the remainder as collected.

As a result the contractor generally starts an account with the bank, which means that in that case the money remains in his hands.

Thus the contractor gives his note to the bank for 50 per cent of the face of the contract, the bank charging him 5 per cent to collect.

Under this plan the contractor is furnished with working capital, enabling him to avail himself of cash discounts and relieving him of a large amount of detail and bookkeeping.

A BARGAIN is often a poor thing to advertise, according to the National Vigilance Committee of the Associated Advertising Clubs of the World. Even when the price reduction is truthfully stated—and the truth-in-advertising advocates hold that bargain advertising promotes exaggeration—the public sometimes refuses to believe the statements, and this applies, even, to stores of high repute.

In support of this contention, William P. Green, the newly appointed secretary of the vigilance committee, cites the case of a Detroit store of high repute which advertised parasols which had been $5, for 98 cents. The reason for the sale was that the handles of the parasols were brittle, but nothing was said about this in the advertisement.

Following the announcement of the bargain, four of the seventeen remaining were sold.

The store tried a new tack. It advertised the parasols again in just the same manner, except that it frankly told of their defect. The advertisement suggested that though the handles were brittle, the parasols were attractive and should, with care, last a long time.

In the meantime, two of the four which had been sold on the first occasion had been returned. The women demanded their money and it was returned, even though the department manager felt they had no right to the money under the circumstances.

Following the second advertisement, all the rest of the parasols were sold. None of them was returned, for the customers had bought them with their eyes open.

This case illustrates the fact, Mr. Green declares, that intelligent people will not believe that a merchant is selling a $5 article for 98 cents unless they are told the reason for the reduction, and the committee contends that the elimination of bargain advertising altogether is better practice.

The best kind of retail advertising, the committee contends, is that which makes permanent customers, rather than that which merely makes sales. Bargain advertising prompts the production of shoddy merchandise and promotes slip-shod merchandising methods.

Advertising which accomplishes the most, as has been proved by the experience of leading stores, is that which tells about the goods and minimizes the price appeal. The price of an article is soon forgotten; the article is often long-remembered. As in the case of the parasols in Detroit, a customer, even though of the bargain hunting class, is nevertheless disappointed if the bargain fails to live up to expectations.

A store which features bargain sale advertising all the time is in danger of establishing itself in the minds of the people as a good place to go when they want cheap stuff, while there are better profits, as well as the promise of a longer merchandising career, for the store which merely advertises good values and fair treatment to customers.

THE ELECTRIC HOME was featured by Liptmaer, Wolf & Company, Portland, Oregon, one of

THE KAISER is trying to get a peace conference started before the Germans get word of our next oversubscribed loan—

BUY LIBERTY BONDS

the largest department stores in Portland, who put on an extensive show window demonstration recently, extending over an entire week. One of the most prominent corner show windows was devoted exclusively to this exhibit, extending about 20 feet on both streets.

"The Electric Home" idea was carried out in detail by Miss Mabel Chase and her colored maid:

Scene 1: Showed Miss Chase reclining on a couch, enjoying the breeze from an electric fan and reading a magazine.

Scene 2: At her dressing table dressing her hair, after which she curled and waved it.

Scene 3: A facial massage, after which she dressed.

Scene 4: Cooked breakfast and swept up the dining room.

Scene 5: She retires to the sewing room.

Scene 6: She does the washing and afterwards the ironing.

Scene 7: Cooks luncheon.

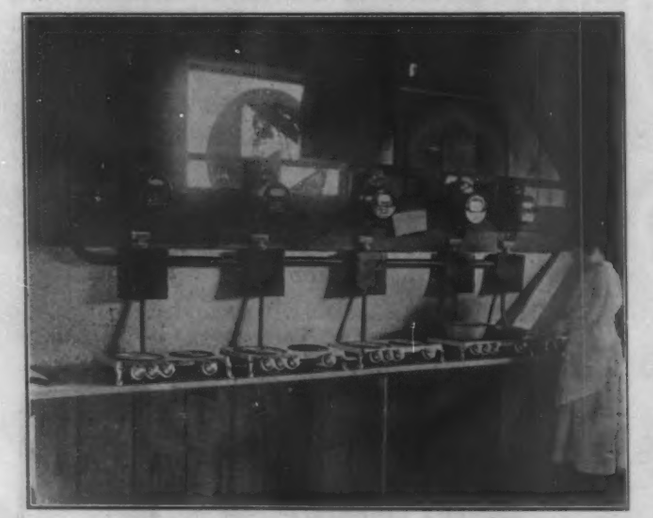
Scene 8: Goes to the theater, appropriate clothing being worn to fit each occasion. In the morning—negligee and house dress; afternoon—afternoon dress.

All the various things demonstrated were operated electrically, and consisted of the following:

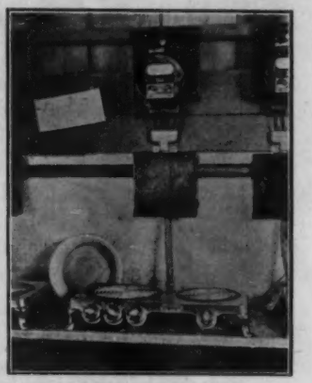
Washing machine, vacuum cleaner, sweeping machine, curling iron and comb, electric hair dryer, vibrator, heating pads, electric iron, percolator, grill, toaster, heater, fan, and flash light.

The idea, of course, was to advertise the electric department of this store, which is in charge of Geo. Linville.

CAMPING OUT would be practiced by more people if it were not accompanied by the necessities of collecting wood for a bonfire and then cooking over one. Camping de luxe has been made possible by the Denver Gas and Electric Company, who incidentally are providing excellent advertisement for the electric store. The tourist automobile camp provided by the city of Denver at Rocky Mountain Lake Park has long been a popular feature with automobilists. As its name implies, it enables traveling motorists to rough it in comparative comfort and with undoubted economy. The advertising value of the use of electricity in a public gathering place such as this, together with the possibilities of an attractive revenue, led the Denver Gas & Electric Company to install five Westinghouse electric stoves, together with prepay coin meters. The custodian sold more than 200 of the five cent slugs in the first few days. Each stove user gets a meter consumption of 625 watt hours for a slug, which means the city of Denver is getting eight cents a kw-hr. The city pays the company four cents, less the discount, on a big power meter, so the coin meters are simply checks belonging to the city. Both stoves and meters were sold to the city, and it is expected that forty or fifty additional stoves will be sold before the end of the season. The city provides free electric light for the auto tourists.



One of the campers using an electric stove



The installation showing stove and coin meter

CONTRACTING ETHICS

(A model code adopted by the California Association of Contractors and Dealers at their recent meeting in Stockton.—The Editor.)

Section 1. Members of the Association shall regard themselves as being engaged in a business of which there is a well defined duty and obligation toward the public and themselves. The business demands that members use every honorable means to uphold the dignity and honor of this vocation, to exalt its standards and to extend its spirit of usefulness.

Section 2. Every member of the Association should be mindful of the public welfare and should participate in those movements for public betterment in which his special training and experience qualify him to act. He should not, even under his client's instruction, engage in or encourage any practices contrary to the Rules and Regulations Safeguarding Life and Property, for as he is not obliged to accept a given piece of work, he cannot, by urging that he has followed his client's instructions, escape the condemnation attaching to his act. Every member of this Association should support all public officials and others who have charge of enforcing safe regulations in the rightful performance of their duty. He should carefully comply with all the laws and regulations touching his vocation, and if any such appear to him unwise or unfair, he should endeavor to have them altered.

Section 3. It is unbusinesslike for a member of the Association to assist unqualified persons to evade or to lend himself in the evasion of any of the recognized rules and regulations governing electrical work.

Section 4. Members of this Association should expose, without fear or favor, the corrupt or dishonest conduct and practice of any member in his business and it is their duty to bring to the attention of the proper authorities the existence of the electrical conditions which are unsafe to life and property.

Section 5. Members of this Association owe a

duty to the business of refusing to furnish estimates to general contractors or others who do not regard bids as final and binding, upon which they are awarded general contracts.

Section 6. Members of this Association shall not falsely or maliciously injure, directly or indirectly, the business reputation, prospects or business of a fellow member of this Association.

Section 7. Members of this Association shall not attempt to supplant a fellow member after definite steps have been taken toward the letting of a contract to him. Nor should they offer any interference in the carrying out of the said contract or commission to the end that loss or damage may result to the fellow member. Each member should realize that he is a business man and anxious to succeed, but that first he is an ethical man, and wishes no success that is not founded on the highest justice and morality.

Section 8. When called to figure work on a job in which there is a doubt whether or not the original contract is finished, do as you would like to be done by and call up your fellow members and see what the conditions are. This procedure should be observed especially where a person is figuring a job out of town, and in such an instance, in order to protect yourself and your fellow members from such injustice as has occurred in the past, it will be advisable in all cases to call the secretary of that particular section in which you are called on to estimate.

Section 9. Attend all the meetings with the same faithfulness that you put into your business, remembering that the officers and those who do attend regularly are doing so for your benefit as well as theirs, and as our Association is strictly to educate its members in business methods, you are not only injuring yourself but the entire trade by not availing yourself of all opportunities for education afforded by our organization.

Section 10. Always remember that confidence begets confidence.

SUPERVISING ELECTRICIAN'S EXAMINATION

(Could you answer these questions applied to the regulations of your own town? This is the set of questions which comprised the examination for Supervising Electrician held in Portland, Aug. 17th.—The Editor.)

Problems—

Applicant to answer any five questions of the following list.

1. How would you determine the size of any stranded wire? Explain in detail.

2. How would you change the rotation of a shunt wound D.C. motor?

3. Diagram connections of 5 h.p., 3 phase motor showing starting controlling devices using knife switch only for starting purpose.

4. At 440 volts and 0 amperes on a direct current 2-wire circuit, what would be the horsepower?

5. Should the wire in size supplying current for 100 5-watt lamps at 110 volts be the same as that supplying 100 5-watt lamps at 11 volts? Work out current values in each case if there is a difference.

6. How many 10 watt, 10 volt lamps in a sign using 90 amperes supply voltage 10 volts?

7. What is the value at all times of a neutral wire on a 3-wire system and what current would be carried through the neutral if 50 lights were on one side and 25 lights on the opposite side, each light taking one ampere each?

8. What size of rubber covered wire in conduit should be used to conform with the requirements of the Electrical Code of the City of Portland with an allowable drop to the farthest lamp of one volt, load consists of 16 incandescent lamps which take ½ ampere, distance 45 feet on a direct current 2-wire system.

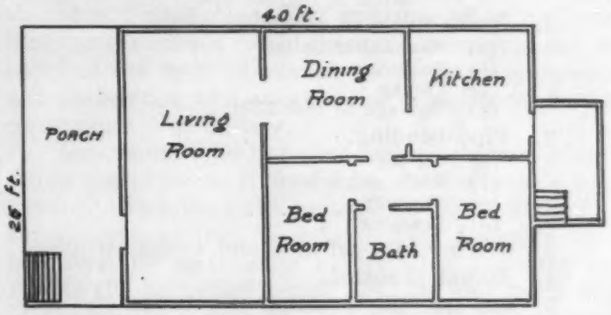
Questions on the Electrical Code—

Answer Question 3 and any nine of the other questions.

1. How would you splice wire in conduit?

2. How would you install exit lights in a theatre? Answer fully.

3. Blue print.



MARK IN NATIONAL ELECTRIC CODE SYMBOLS FOR OUTLETS AS FOLLOWS:

1	Porch	1 Center light on flush switch
	Living Room	1 3-light fixture on flush switch
	Bed Rooms	1 Cord drop. Snap switch
	Dining Rooms	1 2-light fixture—flush switch
	Bath	1 Bracket
	Kitchen	1 Gas and electric fixture—snap switch
	"	1 iron plug on wall
	Living Room	1 floor plug
	Dining Room	1 base plug

2 Mark on plans—allowable wattage for each outlet.

3 Give list of material and approximate quantities, needed to completely wire the above job.

4. What is required where a change is made in the size of a certain size feed wire to one of smaller size?

5. Would you ground any wire of a three phase system? Explain fully.

6. Explain how conduit for a feeder riser in a building 150 feet in height can be installed and in what manner must wire installed in same be taken care of?

7. How must a ground wire be run through a building?

8. Specify at least two places and under what conditions slow burning wire may be used.

9. For concealed knob and tube work what is the correct spacing of insulators and height of knobs?

10. Make a sketch showing the necessary wiring and connections in order to control a single light from two places.

JOSEPH was sold into slavery—not to support our boys would be to put them in a worse position than that—

BUY LIBERTY BONDS

11. What are the Code requirements for the installation of electrical heating devices?

12. What rule applies to the use of alternating current in iron conduit?

13. Give all the special requirements necessary for electric service wires where they enter buildings from an overhead distributing system in the City of Portland.

14. What percentage of full load current must the leads of one three-phase induction motor be designed to carry?

15. Define Ohm's law and write standard formula for same defining each term completely.

16. How many watts in a horsepower?

17. Give formula for figuring drop in voltage on circuits as met with in ordinary interior construction. Define each term completely.

Practical Questions—

Given in regular shop.

1. Make splice in stranded wire.
   - (a) Mechanical splice
   - (b) Soldering
   - (c) Taping
   - (d) Damage to insulation
2. Pipe bending.
   - (a) Off set
   - (b) Right angle bend
   - (c) Threading
   - (d) Reaming
3. Wiring in a set of 3 and 4-way switches.
4. Mount rheostat.
5. Reverse the direction of rotation of a shunt wound motor.

STORE SUGGESTIONS

The fewer goods you show, the less confusion to the customer.

Let the customers do most of the talking until you get your cue, then close.

One store sends an "unknown" buyer to shop about the store, that the management may know more of its own service and how patrons are being treated.

"Cut Out and Keep for Reference" is a sensible admonition, which advertisers begin to put into their ads.

FOURTEEN RULES FOR ELECTRICAL CONTRACTING PRACTICE

The following Code of Practice is recommended to architects, consulting engineers, contractors and owners as well as owners' engineers, by the National Association of Electrical Contractors and Dealers, the Executive Committee of which adopted and approved it as a step toward the standardization of many practices in connection with the original contracts and those for extras which, unless definitely settled in advance, leads to misunderstanding on both sides and frequently to controversies and litigation. The National Association does not, however, attempt to bind its members to use this code, but respectfully submits same for the approval of both customers and contractors.

Rule IV. Each contractor shall provide for the prompt payment, and require final inspection and payment in full within thirty days of the completion of the work covered by said contract, regardless of the final settlement for the building as a whole or for the work of any other trade.

ELECTRICITY ON THE FARM IN SOUTHERN CALIFORNIA

BY W. A. BRACKENRIDGE

(The actual use of electricity on the farm is best gauged by the agricultural load reported by the power company. The president of the Southern California Edison Company here reports the increase of foodstuffs to the amount of 21 million dollars a year as a result of bringing seventy-five thousand acres of arid land under production by electric irrigation during the past year.—The Editor.)

A total expenditure of $5,614,581.33 for new properties was necessary in order that the Southern California Edison Company and its subsidiaries could, during 1917, increase its production of hydro-electricity, provide transmission and distribution lines, in a region of fifty thousand square miles, to meet the demands of new business chiefly created by agriculturists, who are complying with the policy of the government in increasing our food supply.

Six hundred thousand barrels of oil which would otherwise be consumed at steam plants, is set free for war purposes, by an expenditure of over two million dollars for additional reservoir capacity at Huntington Lake. This reservoir supplies the two Big Creek water power plants, which we acquired from the Pacific Light and Power Corporation. The reservoir capacity is increased from 50,000 to 90,000 acre feet.

To carry out similar increases on other water power plants, approximately $500,000 was spent and it required nearly $3,000,000 for distributing lines, and equipment and transmission systems necessary to carry electrical energy to 11,795 new consumers, making our total number of consumers 178,824.

On lands which heretofore were only neglibly productive, our lines were connected during the year, to 899 motors attached to pumps for the irrigation of 75,000 acres of land which, according to Chamber of Commerce statistics, will annually produce $21,000,000 worth of foodstuffs. Shipbuilding, canneries, rolling mills, sugar factories, cement plants, planing mills, packing houses, refrigeration plants and woodworking machinery required large additional power installations.

Without regard to the advance of every item that goes into the cost of construction and operation and the handicap of delays in shipment, we have increased our connected load 70,683 horsepower in one year and have been glad to bear our part of the war burden, and in doing so bringing about demonstrated results. Our present connected load is now 595,804 horsepower, but by reason of the wonderful diversity of the demands in a region approximately as large as the war zone, which is covered by our system, we have thus far met most of our requirements. If the demand came at one time, as is the case with city lighting, it would require plants many times the capacity of all that we possess, but by continually shifting the peak of the power demand, from manufacture by day, lighting in the evening, and irrigation at night, we have been able to keep fairly well abreast of the war production necessities, holding the consumption of oil, which has increased from sixty cents to $1.50 per barrel, comparatively low.

Co-operative Campaign Problems —

BY A. L. SPRING

(Practical suggestions of store and selling methods with particular local application from the Southern California representative of the California Electrical Cooperative Campaign.—The Editor.)

USE OF MANUFACTURERS AND JOBBERS ADVERTISING LITERATURE

A very small percentage of contractor-dealers properly use advertising literature furnished them by the manufacturers and jobbers. This is a valuable asset to the contractor-dealer and should be capitalized. He should remember that these booklets are made for the customers, and he should take advantage of every opportunity to get them into their hands; it is money in his pocket if he does.

Nearly always there are to be seen in a dealer's store booklets piled on the show-case, counter or display table. It is impossible to keep booklets neat in this way, they always get mussed up. However the idea of having booklets where the consumers help themselves is essential, but a rack should be made or obtained that holds the booklets and displays them attractively. One of the best forms of racks to use is one that can easily be made of three-eighths inch wood and finished the same as the woodwork in the store. This rack is like a time-table rack and should contain pockets enough and of different sizes to handle the complete assortment of literature. A similar rack can also be made of galvanized iron. This rack can be made to hang in a conspicuous and convenient place on the wall, or made to stand on the counter or table. In any case it should be placed so that the customers will help themselves and the clerks will be reminded to use the booklets more frequently.

No one should come into the store to buy or inquire about an article without taking away with them literature on that article and when advisable on other articles. Every package leaving the store should have with it four or five booklets covering the principle appliances, particularly seasonable articles. The best and the surest method of doing this is to have four or five booklets selected by the dealer and have these put up in sets of one of each with a rubber band around them. These should be placed under the counter near the wrapping paper so that they will be put in every package that leaves the store. This is important for not only do these booklets reach the consumer's home but do so at a very opportune time. The consumer having just purchased an electrical appliance is in a receptive mood, will be interested in the booklets, and the appliance which they have purchased will do as all electrical appliances do—give excellent service and assist in having this customer return to this dealer whose booklets he has read and buy other appliances. Consumers make good salesmen for the dealer if they have the proper booklets, and the dealer should overlook no opportunity to get booklets into their hands. Several cases such as the following have come to the attention of the Field Representative. In a small town in Southern California a dealer has sold without solicitation six vacuum cleaners of one make to customers all in two blocks. The lady who purchased the first cleaner was a good talker and assisted by the booklet delivered by the dealer with the vacuum cleaner the other sales followed.

One dealer has followed the plan of sending a package of assorted advertising lietrature to every job when the material is delivered. The foreman on the job is held responsible for this literature reaching the proper party. This is getting after the business early and has shown results.

Whenever a dealer has a lamp knocking machine, a washing machine or any appliance of this kind in the entrance to his store or in front of the show window a small rack with advertising literature should be placed with the device so that those interested can help themselves.

No letter, bill or statement should leave the dealer's establishment without advertising literature going with it. If an appliance is loaned to the Red Cross, a church organization or club the dealer should not neglect sending a supply of advertising literature enclosed with them. An assortment of booklets can to good advantage be put in envelopes and mailed out to a selected list or delivered to the consumer's door by boy.

One dealer who has used manufacturers' advertising literature as it should be used offered a suggestion which it might be well for other dealers in certain communities to follow. This dealer in looking over his statements before they are sent out selects the literature which is to be sent to certain of his regular customers. If for instance Mrs. Smith has purchased a washing machine from him, he does not send her literature on this device, although it is the one he is sending this month to most of his customers, but selects literature on an appliance which he knows she does not have. There are other ways than those mentioned in which to use manufacturers' literature with good results. There is nothing much more important to the success of electrical merchandising than the proper use of advertising literature.

LIBERTY LOAN WINDOWS

Among the ideas for windows to tie in with the Liberty Loan Campaign sent out in a recent circular letter by the Cooperative Campaign, one or two suggestions were made which might be added to the list of Liberty Loan Windows appearing in the last issue of the Journal of Electricity. By washing one of the regular Liberty Loan posters on the back with oil, of any sort, the white portion becomes translucent and not only does the picture stand out with particular emphasis in the day time, but it may be made very effective at night by floodlighting from the rear. Another effective use of the posters consists in focussing a spotlight on the poster at night, leaving the rest of the window in darkness. Both of these methods are peculiarly electrical and serve not only to help the campaign, but emphasize the location of the electrical store.

ADMIRAL DEWEY was the hero of the Spanish American war—are you worthy of the heroes of this war?

BUY LIBERTY BONDS

A ONE DAY ELECTRICAL CONVENTION

(The Northwest Electric Light & Power Association limited its Eleventh Annual Convention at Portland to a one day session. The forty earnest men gathered for serious work made up in spirit and enthusiasm what might otherwise have proved an uninteresting and uninstructive gathering.—The Editor.)

President Guy W. Talbot, of the Northwest Electric Light & Power Association, ably struck the keynote of present utility association effort when he stated that the need of the industry to meet the crying demands of the hour are two-fold—closer unity among all branches of the industry and a clearer conception on the part of the public concerning the present trying problems that threaten the power industry in the West. To meet the first demand he pointed out necessitated the development of a higher spirit of cooperation among all branches of the industry, while to effect the latter a concerted plan of educating the public must be undertaken.

Upon recommendation of the public policy committee the Convention voted to devote every effort to educate the public on the unfairness of the present power legislation in the State of Washington where it is unlawful for a regulating commission to ever raise rates. Effort will be made to have the present enactment amended. Likewise it was voted to urge that the raising of rates be made on the basis of the condition of costs of service and not in the nature of surcharges as allowed in the State of California.

GUY W. TALBOT, PRESIDENT OF THE NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

Mr. Talbot struck the keynote of the Convention when he stated in his address that two imperative needs face the electrical industry at present—closer cooperation among all branches of the industry and a fuller understanding on the part of the public of the acute problems that now face the industry.

H. H. Schoolfield, chairman of the hydroelectric committee, reported that the committee had now sufficient convincing data on hand to present to the U. S. Bureau of Standards that it is thought will be sufficiently convincing to bring about a few modifications in the newly revised National Safety Code so as to make the Code entirely satisfactory to the Association and to the Pacific Coast Section N. E. L. A. This latter information he said was conveyed through interchange of committee members with the Pacific Coast Section, N. E. L. A., and the Northwest Electric Light & Power Association.

The financial condition of the association was shown to be excellent with something like three thousand dollars in the treasury. The total membership is 221 which is the largest in the history of the organization.

A strong resolution was adopted endorsing the patriotic resolutions of the National Electric Light Association of last June and offering to the President of the United States every material aid within its possession to bring the war to a successful conclusion.

The gathering, though small, was quite representative in its attendance as may be noted from the following list of attendance:

C. R. Young, Pacific Power & Light Company, Portland.
O. B. Frank, Douglas County Light & Water Company, Roseburg, Ore.
George Bowen, Northwestern Electric Company, Portland.
A. D. Leach, Northwestern Electric Company, Portland.
A. N. Cudworth, Northwestern Electric Company, Portland.
L. A. McArthur, Gen. Mgr. Pacific Power & Light Company, Portland.
Franklin T. Griffith, President Portland Railway, Power & Light Company, Portland.
O. B. Caldwell, Gen. Supt. Portland Railway, Light & Power Company, Portland.
Guy W. Talbot, President of Association and President Pacific Power & Light Company, Portland.
Geo. L. Myers, Secretary to Association and Secretary to President Pacific Power & Light Company, Portland.
F. D. Weber, Oregon Insurance Rating Bureau, Portland.
H. L. Bleeker, Vice-President and Gen. Mgr. Washington Water Power Co., Spokane.
H. V. Gates, Hillsboro Power & Investment Company, Hillsboro, Oregon.
W. A. Scott, Electrical Review, Chicago.
Elmer Dover, President Mountain States Power Company, of the H. M. Byllesby Company, Tacoma, Wash.
A. C. McMicken, Portland Railway, Light & Power Company, Salesmanager, Portland, Oregon.
E. G. Robinson, Molalla Electric Company, Molalla, Oregon.
H. H. Schoolfield, Chief Engineer Pacific Power & Light Company, Portland.
F. H. Murphy, Illuminating Engineer, Portland Railway, Light & Power Company, Portland.
H. C. Schade, Portland Railway, Light & Power Company, Portland.
C. J. Edwards, Tillamook, Oregon.
C. E. Taylor, General Manager Stayton Electric Light Company, Stayton, Oregon.
J. D. Brown, President and Gen. Mgr. Wenatchee Gas & Electric Company, Wenatchee, Wash.
L. V. Harpa, Chelan, Wash.
C. M. Shinn, Cottage Grove Electric Company, Cottage Grove, Oregon.

O. G. F. Markhus, Idaho Power Company, Boise, Ida.
P. A. Bertrand, Grays Harbor Railway & Light Company, Aberdeen, Wash.
Robert Sibley, Editor Journal of Electricity, San Francisco, California.
John Harisberger, Gen'l Supt. Puget Sound Traction Light & Power Company, Seattle, Wash.
H. L. Walther, California-Oregon Power Company, Medford, Oregon.
J. T. Thompson, Yamhill Light & Power Company, Sheridan, Oregon.
R. M. Townsend, Portland Railway, Light & Power Company, Portland, Oregon.
W. R. Echternach, Washington-Idaho Light & Power Company, Lewiston, Ida.
L. T. Merwin, Northwestern Electric Company, Portland.

The new officers for the year 1918-19 as elected are as follows:

Officers Elected for 1918-19

President—L. B. Faulkner, Olympia Light & Power Company, Olympia, Wash.
Vice-President (for Washington)—H. L. Bleeker, The Washington Water Power Company, Spokane.
Vice-President (for Oregon)—H. L. Walther, California-Oregon Power Company, Medford, Oregon.
Vice-President (for Idaho)—Wm. T. Wallace, Idaho Power & Light Company, Boise, Idaho.
Vice-President (for Montana)—J. F. Roche, Montana Power Company, Butte, Montana.

THE PRESIDENT'S ADDRESS

BY GUY W. TALBOT

War Time Demands —

The Association has not been as active as it might have been during the present Administration because of the extraordinary and abnormal conditions prevailing in the central station industry due to the war. Each public utility has been seriously engrossed in its own immediate problems, which have precluded each from being active in Association affairs. The vital question of revenue and finance and the instability of personnel, due to military and naval demands and intense competition, owing to the phenomenal industrial activity, have necessitated the close application of the management of each utility to a preservation of its property and its maintenance in at least a reasonable state of efficiency to afford adequate service and meet the demands for expansion essential to a proper and effective support of the whole industrial organism upon which a successful prosecution of the war depends. This made it desirable, in the wisdom of your Executive Committee, to deviate from the practice of the past by holding a one-day session to be consumed in reports of the respective committees, reading of papers and an open session to representatives from Class A members for general discussion, rather than the usual three-day convention. It was the purpose to make this session strictly business in its nature, without the usual entertainment and social features.

The Problems of the Day —

The problems that have engaged the attention of each industry are the problems of all of us. The changed conditions produced by the war, even prior to our own country's participation in it, but much more acute since our state of belligerency, have confronted the industry with problems of a most perplexing nature. Constantly rising prices for materials and labor and the much greater cost of money have served to deplete our revenues in a most radical manner and necessarily have so influenced our financial condition as to make it almost impossible to meet the demands for necessary maintenance and enlarged service. Those economic forces that work freely in response to what is known as the law of supply and demand are not applicable in whole to our industry. They work ruthlessly in a prejudicial manner, that of increased costs. They do not work fairly by affording corresponding increases in revenue, because they do not work freely. That is left to the mandate of regulation. Regulation that is intelligent, fair and equitable will meet rising costs with compensating revenues through grant of increased rates. Public service commissions aim to be fair and just, but are disposed to be led by and not to lead public opinion. The injustice that has been done public utilities in the present critical period is not one of motives, but decision. Delay in giving relief has served to place public utilities generally in a most precarious financial condition. The ills of increased costs certainly were apparent to the commissions, and the rate advances equally obvious. Public opinion was largely uninformed as to the facts and needed to be led by action of the commissions. The vital importance of the industry to the war and the necessity for maintaining its operating efficiency and credit have been forcefully brought to the attention of local regulatory authorities and the public by the Federal Government. This has been beneficial in arousing public interest and expediting grants of relief.

The Remedies —

There is much to be done to place the industry as a whole in a healthy financial condition. One of the practical means for the public utilities to get adequate and universal relief is to help themselves through cooperative action. No chain is stronger than its weakest link. Therefore we must act in unison if the industry is to be strong. It is my recommendation, therefore, that the efforts of the Association for the forthcoming year and as long thereafter as the necessity exists be practically undividedly devoted to the question of ways and means to inform the public and to obtain the necessary relief to keep the industry in a state of necessary efficiency, in order that it may be in position to respond effectively to the necessities of war production, direct and indirect, and meet its obligations to the investing public.

This should be done through a strong public policy committee, free to act for the Association under such direction and limitations as the Executive Committee may deem best to exercise and impose.

The National Committee —

The National Committee on Public Utility Conditions, with headquarters at Washington, D. C., has been organized, through the mutual efforts of the National Electric Light Association, American Elec-

ALICE IN WONDERLAND saw many strange things but none stranger than the citizen who would let the other man make all the sacrifice—

BUY LIBERTY BONDS

tric Railway Association, American Gas Institute and National Commercial Gas Association. Its purpose is educational. To bring to the attention of the federal, state and municipal authorities the importance of the public utilities to the war and the necessity for relief through augmented revenues to keep them in a solvent and efficient condition. What are known as regional committees have been organized under jurisdiction of the National Committee. These regional committees study the problems of their regions and disseminate information of the need and progress for relief. The National Committee brought to the attention of the Comptroller of the Currency, Treasury Department, at Washington, in an exhaustive analysis of facts, the serious situation confronting public utilities, which caused the Comptroller to set forth in his annual report the vital necessity of preserving and maintaining their credit and operating efficiency as essential to the war. This report was followed by the correspondence publicly exchanged between the Secretary of the Treasury and the President, which brought the situation forcefully to the attention of the public and regulatory authorities. The National and regional committees have done and are doing most effective educational work with excellent results. The effectiveness of our regional committee can be increased with the practical cooperation of our Association. Members of our public policy committee have been cooperating and the Association is ready and willing to lend assistance wherever and whenever possible. It is only through education that public support can be gained. If the public has a proper knowledge and understanding it will be reasonable. If it has not it will be guided by its prejudices. An intelligent public opinion determines whether we prosper or languish. And it is intelligent only as it is informed.

Finance —

The problems of finance are doubly burdensome because of the high cost of money and the inadequacy of revenues.

The demands for ordinary extensions should be financed by those who are to benefit. And it is and should be the object to hold each extension to the requirement of war necessity. Labor and materials must be conserved to meet the exigencies of war. No unnecessary drain can be permitted upon the financial resources which are being taxed to the limit to meet the war demands.

The Capital Issues Committee, which supervises the issuance of new securities for capital expenditures, has addressed a communication to public utilities commissions and municipal officials, stating that "existing facilities must be made to serve in place of new ones, regardless of temporary inconvenience and discomfort, unless the public health or paramount local economic necessity is involved," and suggesting that "extensions and betterments which public service corporations are accustomed to make in normal times * * * be postponed until after the war, unless an immediate war purpose is served," and asking consideration "of the propriety of deferring even the performance of contractual obligations arising from franchise or other local requirements, when no military or local economic necessity is served by such expenditures."

The policy of restricting financial commitments to war essentials is one of morals as well as of economics. It is our patriotic duty to take as little as possible from the common reservoir of capital, labor and materials, in order that essential war activities may be conducted as efficiently as possible and the burdens of finance rest as lightly as possible upon the future. Our strength and security when normal conditions are reestablished will be measured by our efficiency and conservation at this hour. The burdens of fixed capital charges must be kept at a minimum if we are to participate successfully in the industrial competition after the war.

Large-scale developments by private capital are not practicable under present conditions. Those that may be necessary to the war program can be undertaken only with the aid of the Federal Government or by the Government itself. Developments privately financed under these conditions could not be self-sustaining subsequent to the war unless subsidized or financed under some plan to amortize extraordinary costs during the war and reconstruction period. If the history of post-bellum economic conditions repeats itself the normal economic state will not be restored for a period of from fifteen to twenty years, during which time the price levels will gradually decline. If intelligent provision for protection from abnormal fixed charges by reason of excessive investment is not made, competition, under normal conditions, will work to confiscate such investments, or the market for power under large-scale production will be lacking because of the attraction of industries to cheaper sources of power, installed at a saving of capital and capital charges in the normal period to come. Hence confiscation of invested capital is a possibility of such positive menace as to discourage private investment independent of Government cooperation.

It is hoped that these conditions and their true significance will be appreciated. It would be a serious mistake to regard them as justifying or arguing for public ownership. The public is entitled to protection from wasteful or burdensome capital expenditures, whether under private or public administration. Individual initiative and genius that have characterized the remarkable development of the industry in the face of much adverse legislation and restrictive regulation should not be devitalized. The industry has not fallen down. Its efficiency in spite of almost insuperable difficulties is evidence of what can be done in cooperation with the Federal Government to provide a means of financing that will protect the investment for the future, not from the shortcomings of management, but from the burdens of excessive capital investment, necessitated by the demands for war service, to make preservation of the property for the future reasonably assured. And regulation has not failed. It is only in the process of development as an effective agency to protect public and industry alike. The functions of Government will be extensive enough subsequent to the war without venturing into a vast scheme of socialized industry.

Taxation —

Our industry does not seek nor wish to evade any just and equitable burden of taxation. However, it ought to be borne in mind by those who have the power to impose taxation that the industry is not able to carry onerous or discriminatory burdens. The industries which have the freedom, even though somewhat restricted by an exercise of price-fixing and profit-limiting powers at the present time, to absorb the tax or the greater portion of it from their consumers, are in a much different and more fortunate position. Our industry, already hard pressed for sufficient revenue, cannot readily pass the burden on to the consumer nor an appreciable part of it. It must await the tedious processes of regulation to provide more revenue, during which time not infrequently it is possible to seriously jeopardize its solvency.

It is recognized by those who are informed that where return is limited to what is deemed reasonable upon what is determined by regulation to be the fair value of a public utility any burdens of taxation must be borne by the consumer as a part of the charge for service. If they are not what is a reasonable return will not be earned and an injustice will be done to invested capital. Therefore, no arbitrary burdens of taxation should be imposed by either Federal or local authorities, because of the inability of the industry to bear them. There is no freedom to readily adjust revenues to meet such burdens.

Federal Water Power Legislation —

Although the necessity for legislation by Congress to provide for the development of water powers in the public domain and navigable streams is even greater now than at any time in our history as a means of fuel conservation and to aid in the production and distribution of essential war materials and supplies none has been enacted.

It is to be greatly regretted that conflicting ideas of theory and practice have prevented constructive action so as to have been prepared for the service that hydroelectrical development should have rendered in the present crisis. The financial situation now prevents any large-scale development by private initiative independent of Government cooperation and aid. Problems of finance are difficult enough for the requirements of necessary expansion. However, no public utility is unwilling to do what the Government deems necessary to provide greater power service, but the Government to all intents and purposes must become a partner in a practical scheme of finance that will make imperative immediate development possible and reasonably assure preservation of the property in the future. An independent policy of finance under such extraordinarily abnormal economic conditions as prevail can and would produce confiscation or almost inextricable financial difficulties under normal conditions, especially with regulation applicable. What cannot be done cooperatively with the Federal Government must be accomplished by the Government itself. Such paternalism as must be practiced is attributable to unpreparedness through the lack of practical legislation that would permit of private development.

There is good prospect of legislation being enacted shortly. The bill pending as reported by the Special Committee on Water Power is generally believed to have so effected an accommodation of conflicting ideas as to make private development possible.

What Congresses have failed to provide as a measure of industrial preparedness in war time seems to be practically assured as a measure of industrial preparedness for peace times. And it is of vital importance that this should be so, because the post-bellum trade among the nations promises commercial and industrial competition of the keenest order. Power is the basic essential of production and the economy of its utilization will very appreciably influence the extent to which we can successfully compete by helping to keep production costs low. We must commence now to look to the conditions that will be prevalent when peace is once more restored. It is much better that we should be made fully equipped at the outset by an intelligent exercise of foresight than that our hindsight should cause us to meditate on lost markets. That is why, even at this late day, when we are at war and need power more than at any previous time, we should act constructively and promptly because the day of peace is known to no man.

State Legislation —

Legislatures in the various states of Association territory will be in session the forthcoming winter and it is to be hoped that the policy of each legislature will be to act constructively and not destructively. No industry at any time ,and especially in this crucial period, should be subjected to unwarranted and unjustified acts of prejudice. There is much that could be accomplished of mutual benefit to the public and the industry in legislation, and it should be the aim of the Association to find means to make the public understand the problems of the industry and dissipate petty prejudice and irresponsible attack.

For detailed information with respect to various specialized activities reference is made to the reports of those committees that have been active, which are made a part of our printed proceedings.

This meeting should not adjourn without adopting a resolution pledging the unselfish and loyal support of the Association to the Administration in its efforts to direct the energies of the people to a determined and relentless prosecution of the war in order that an unconditional military decision may be achieved by us and our Allies to assure a peace of justice and permanence among the nations of the earth, and crush completely beyond the power of resurrection the spirit of autocracy that has made brutal force its creed to gain dominance of the world and make free peoples mere vassals to serve taskmasters.

ARCHIMEDES discovered the law of floating bodies—the problem of floating this loan is your personal responsibility—

BUY LIBERTY BONDS

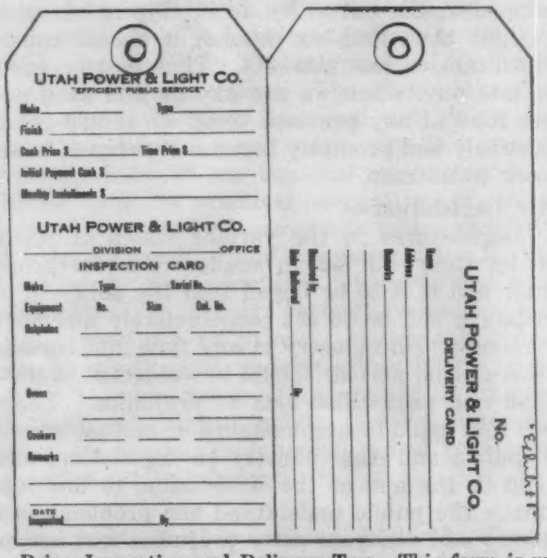
THE ELECTRIC RANGE AND WATER HEATER

REPORT OF ELECTRIC RANGE COMMITTEE, W. R. PUTNAM, CHAIRMAN

(A discussion of the discount situation and maintenance costs of electric ranges, with data on the importance and value of the electric water heater as a range adjunct. Extracts from the report of the Electric Range Committee at the convention of the Northwest Electric Light and Power Association at Portland.—The Editor.)

Discount Situation

Your committee has actively followed the action of your Association taken at the Spokane convention, which urged upon the Supervisor of the Nickel Chromium Resistance Element patents that steps be taken to give the central stations discounts for quantity purchases at least equal to those received by the jobbers. The N. E. L. A. was urged to appoint a committee to follow this situation with the Supervisor and the manufacturers, but on account of war conditions no action was immediately taken by the N. E. L. A. executives.



Price, Inspection and Delivery Tag.—This form is made in two sections, each with the same information. One copy is left attached to range when delivered and shows price at which range is sold, also amount of installment payments, if any. This avoids future controversy with customer as to amount of such payments. The other copy of this tag is retained in Range Department files as means of checking any defects or damage that may develop after range leaves store room for delivery. Inspection information is transferred from this form to form shown in Figure 3, for permanent record.

In February, 1918, the Supervisor took the requested action, making the discounts to the central stations and to the jobbers as follows:

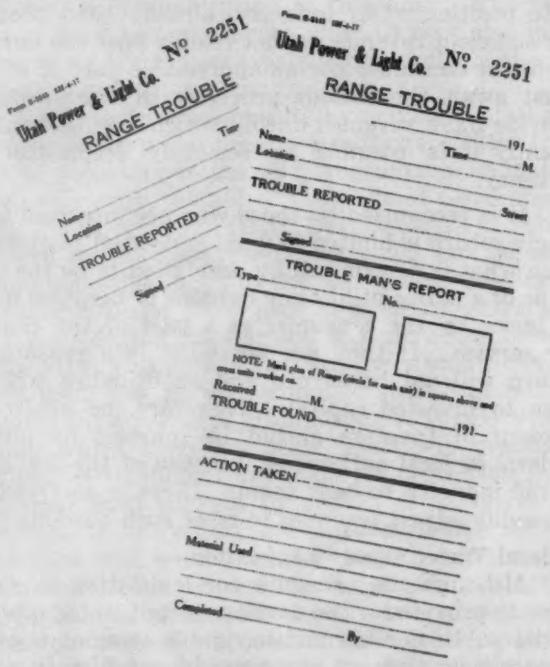
On bona fide orders given at one time for $10,000 worth net of ranges to be taken within one year—discount 25—10 and 10%. In event purchases amount to $15,000 during year an additional 2% rebate will be given at end of year, or if definite non-cancellable order for $15,000 worth of ranges to be taken within one year is placed, the discount of 25, 10, 10 and 2% will be extended on such order and on any other range purchases during the year, in addition to the $15,000 worth.

Discounts on all smaller orders for ranges will be 25 and 10%.

Unfortunately at the same time the Supervisor changed the central station discount on appliances as follows:

Discounts on appliance purchases of not less than $1,000.00 net value will be 30 and 7⅛%.

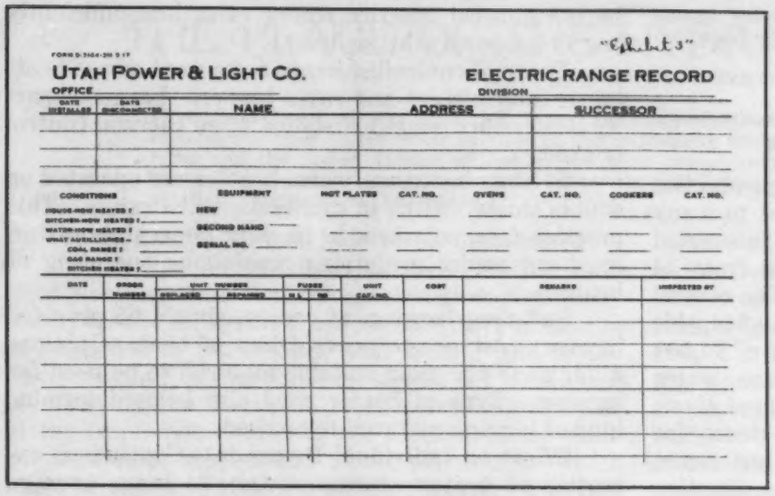
Orders for $5,000.00 net value (using nickel chromium alloy), not including ranges, will be entitled to discount of 30 and 7½% and an extra 7½. Each order must be placed for delivery within 30 days.



Trouble Report.—This is form used in recording range trouble reports. These are bound in book form and one copy perforated. The trouble call is recorded in duplicate and original turned over to range trouble-man, who completes report and turns in slip for file. Record of trouble is transferred to form shown in Figure 3.

This gives the jobber a preferential discount. These changes were effective on April 1st, 1918, and as a result of same, pressure was brought to bear upon the executives of the N. E. L. A. resulting in the appointing of a committee of three representatives of the larger central stations of the East. This committee met with the Supervisor early in April in New York at which time representatives of jobbers and manufacturers were requested to be present. The meeting was not well attended and consequently another meeting was called for Chicago on April 26, 1918. None of your committee were able to be present at this meeting, but the committee sent the following recommendations by wire to the Supervisor:

"Suggest following subjects for consideration and favorable action at your conference. Bona fide range order for ten thousand dollars should not necessarily specify types and numbers of ranges with initial order. Should have lower price on range elements for renewals. Open coil elements should not carry same list as enclosed elements. Purchase of resistance wire should be provided for at reasonable price for rethreading open coil units and for repairing and testing appliances, particularly industrial appliances. Guarantee on units should be extended to either two or three years. Appliance discounts should be based on quantity irrespective of whether purchased by jobber, dealer or central station. In case jobber does secure preferential discount he should be required to



"Exhibit 3"

UTAH POWER & LIGHT CO. ELECTRIC RANGE RECORD

OFFICE DIVISION

DATE INSTALLED	DATE DISCONNECTED	NAME	ADDRESS	SUCCESSOR

CONDITIONS	EQUIPMENT	HOT PLATES	CAT. NO.	OVENS	CAT. NO.	COOKERS	CAT. NO.
HOUSE HOW HEATED ?	NEW						
KITCHEN HOW HEATED ?	SECOND HAND						
WATER HOW HEATED ?							
WHAT AUXILLIARIES —	SERIAL NO.						
COAL RANGE ?							
GAS RANGE ?							
KITCHEN HEATER ?							

DATE	ORDER NUMBER	UNIT NUMBER DELIVERED	UNIT NUMBER RECLAIMED	FUSES AMPS.	FUSES NO.	UNIT CAT. NO.	COST	REMARKS	INSPECTED BY

ELECTRIC RANGE RECORD

This form is filled out for each electric range customer and is a complete up-to-date record of customer's installation at all times, showing number of inspections made, repairs, replacements, etc.

carry sufficient stock for territory requirements. Central stations then should be allowed to purchase any annual requirements above five thousand dollars at their maximum discount, although purchased in small quantities from time to time. Believe Edison appliances should be consolidated for quantity purchases."

We are informed that there were 10 central station men, 8 jobbers, and 10 manufacturers present at this meeting and that a very warm discussion took place between the jobbers and central stations, each presenting their views as to the necessity for special consideration for their claims.

As a result of this meeting the Supervisor called a meeting of the manufacturers in New York the latter part of May, at which the whole matter was further discussed. Your committee again wired recommendations as follows:

"Have recently discussed appliances and ranges discount situation with many central station men of Pacific Coast. While not unanimous in all points, majority favor discount schedules somewhat similar to lamp schedules for both ranges and appliances. This arrangement allows jobbers preferential if they are actually jobbing in their territory. In case jobbers are to be allowed special preferential on appliances this should be allowed only to jobbers who carry adequate stocks. Desire arrangements for purchase resistance wire also adjustment price on open coil elements and arrangements for consolidation Edison appliance purchases."

At the time of writing this report, no definite action has been taken by the Supervisor, but indications are that action will be taken which will be favorable to the central stations. Definite changes in discounts will undoubtedly be available in time for consideration at the Portland convention.

This situation has brought out in a very marked way the wide divergence of interest between central stations in various parts of the country and operating under different conditions. Many of the central stations are not at all interested as yet in electric range sales and consequently were perfectly willing to trade the range situation for benefits to be secured from appliance discounts. On the other hand a considerable portion of the larger central stations of the West were as much interested and some of them more interested in securing advantageous discounts on ranges as on appliances.

We are pleased to report that the Supervisor has given your committee the utmost consideration, appreciating the importance of taking the best action possible to further encourage range development in the West.

Average Maintenance Costs

During the 12 months ending April 30th, the following average maintenance costs obtained with this company, for each range installed:

AVERAGE MAINTENANCE COSTS

Lumber	$1.44
Material furnished by manufacturer	2.52
Material furnished by company	.14
Miscellaneous expense	.41
Total	$5.51

Records of one central station show the following figures with regard to cost of maintaining ranges for the first five months of 1918:

1918 MAINTENANCE COSTS

Cost of Repairing		Average per Range in Use.	Average Cost per Call.
Labor	$1073.64	$ .57	$ .71
Materials Mfg.	2948.50	1.56	1.94
Materials, Company	312.15	.12	.21
Miscellaneous	397.97	.22	.26
Total	$4732.26	$2.47	$3.12
Less $2948.50 replaced by Mfg.	2948.50	1.54	1.94
Net	$1782.76	$ .93	$1.18

THE ELECTRICAL WATER HEATER

Water Heating

Your committee on water heating have devoted a considerable amount of time to the study of the water heating situation, as they appreciate that the water heating load will eventually be a very desirable addition to residential earnings and will materially strengthen the work which the electric range is doing in turning unprofitable residential business into profitable business for the central station.

Problems Yet to be Solved

The use of electric water heaters has not anywhere near kept pace with the use of electric ranges, due to many problems in connection with electric water heating being still unsolved, viz.:

Proper rate.
Type of water heater, whether circulating, plastic or immersion.
Question of continuous service for water heater or controlled service.

THE CZAR OF RUSSIA gave up his throne because he had to but you are expected to do your share willingly—

BUY LIBERTY BONDS

Question as to whether controlled service should eliminate water heater on range peak or from system peak or both.

Question as to whether additional thermostatic control service should be used.

Question of eliminating present high maintenance costs where line troubles are experienced in the water.

For the purpose of determining present practice of central stations a questionnaire was sent to many of the central stations and manufacturers interested in water heating. Answers were received from 14 central stations and two manufacturers. The central stations answering serve a population of 10,544,040; have 534,908 residential customers; have 14,501 electric ranges installed and 4,359 electric water heaters installed. Of the central stations listed above 8 have hydro-electric generation, with steam for emergency use in one or two cases; one has steam generation exclusively, and five have combination hydro-electric and steam generation.

Water Heater Construction

On account of the different kinds of water encountered in different localities it is, of course, practically impossible to specify what type of heater should be generally used. Information from different sections of the country reveals varying opinions as to proper type. The precipitants in the water will in most instances govern the method of heating used.

A number of good suggestions have been received by your committee from reporting companies as to features that should be considered in design of water heaters. Some of these are as follows:

The opinion is practically unanimous that circulating and immersion heaters should be simply designed so that heating element can be removed and replaced without necessity of disturbing the plumbing. Plumber should not be necessary in such work.

Heating elements should be so designed as to make cost of renewal small to customer.

Heating surface exposed to water should be relatively large.

Resistance wire should be of sufficient size to operate at other than red heat, so as to eliminate, as much as possible, formation of scale, which forms in increasing quantities with increased heat.

Thermostatic control seems desirable both for temperature control and safety protection.

Following is statement as to types of heaters used in various localities:

	No. of Companies Using
Circulating type	10
Immersion type	6
Thermal control	5
Plastic	1

Some companies, of course, use more than one type of heater. We find that heaters are installed in varying sizes from 500 watts to 5,000 watts capacity. The number of companies using different capacity heaters is shown below:

500 watts capacity	1
600 " "	2
750 " "	3
1000 " "	2
1500 " "	2
2000 " "	2
3000 " "	3
4000 " "	2
5000 " "	2

Installation.—Due to varying conditions, different sections of the country report different types of installation are preferable in their particular locality, but summarizing reports received indicates the following:

Continuous operation of water heaters seems to be the general practice where rates are sufficiently low (1½c per kw-hr. or less).

Thermal controlled heaters are used where heating is intermittent and rates higher. Larger capacity heaters are usually installed when thermal control is used.

In some instances, water heaters are operated on double throw switch in connection with range. This practice does not seem to be very general, however, most companies preferring continuous operating of heaters.

Sufficient lagging, of course, should be provided in every instance to prevent loss of heat. Opinions differ as to the most suitable material to be used for lagging. Type of heater used also helps determine kind of lagging material to be used.

Effect on Individual Demands.—Continuous operation of heaters increases the 24 hour average demand, but produces less strain on system than intermittent use of heaters.

One advantage of double throw switch control is that water heaters up to 1000 watts capacity can be used without increasing the individual demand and without increasing transformer capacity equipped to serve customer.

Cost of Installation.—Cost of installation depends upon local conditions, type of heater, etc. Plumbing charges, as reported by various companies, range from $2.00 to $15.00; insulation from $3.00 to $10.00. From answers to questionnaire it is impossible to arrive at average figures, as some companies include plumbing only, some plumbing and insulation, while others report complete cost, including heater, etc.

Insulation.—Hair felt, asbestos covers, vitribestos cement, sil-o-cel and sawdust are the principal materials used for tank insulation by companies reporting.

Temperature.—The temperature of water at intake of heater runs from 45 degrees to 60 degrees, depending on the season of the year.

Operation and Maintenance

With regard to the determination of proper electrical capacity to be installed in different homes we find that the quantity of hot water, the temperature of the hot water and the system of water heating—whether it is intermittent or storage—determines the electrical capacity of the water heater. The quantity of hot water and the temperature vary with the habits of different communities and the habits of the individual consumers. A satisfactory method of determining capacity for various sized families that can be standardized, has not as yet been worked out and your committee feels that for some time to come each individual case must be governed by its special requirements.

Analysis of Water.—Answers to this question indicate that condition of the water supply is widely different in various sections of the country. Some companies report difficulty with electric water heating due to line troubles while other companies report absolutely no trouble whatever from this source. Where sediment does form rapidly, various means are used for removing the scale, including scraping, acids, etc.

THE PLACE OF THE HYDRAULIC FILL DAM

BY C. E. GRUNSKY

(The limitations of hydraulic fill dams and their place. A discussion of considerable interest to electrical men of the West in view of the importance of dams in hydraulic power development and the recent failure of one of the most conspicuous examples of this type of structure. The paper is one given recently before the San Francisco Section of the American Society of Civil Engineers.—The Editor.)

The Hydraulic Method Not to be Condemned

The hydraulic fill dams already in use sufficiently demonstrate that the construction of dams by the hydraulic fill method has merit. Such accidents as happened to the Necaxa dam in 1909 and to the Calaveras dam in March, 1918, should not be allowed to discredit the method. They serve, however, in giving some definiteness to the limitations to which the method is subject and to the precautions which must be taken to insure a safe structure. The fact that in both of these cases the tops of these dams were at heights of 150 to 200 feet, when the slides occurred, may be accepted, moreover, as good evidence that the construction of high dams by this method is feasible. Probably in neither of these cases would there have been any failure if the progress of erection had been slower, if more time had been allowed for the unwatering of the material of which the dams were being built.

Importance of Clay Material

It is obvious to any engineer who has reflected on the problems connected with the serviceability of earth dams that the presence of a certain amount of finely divided material, of which clay is typical, is essential as a component part of the finished earth embankment and that the ideal disposition of this material would be throughout the mass of structure with preponderance at points near the up-stream face so that any moisture that may penetrate through the up-stream portion of the structure will find less and less resistance to its passage as it approaches the down-stream face.

The ideal is more readily obtainable when the method of construction is dry fill than when it is hydraulic fill. The hydraulic fill method of construction requires that provision be made to confine the water with which material is floated into place long enough to let this material settle. There must consequently be barriers erected which will pond the water on top of the dam.

The Usual Practice

The ordinary practice is to place these barriers along the up-stream and down-stream edges of the top of the dam and to let the sluiced material be discharged along these barriers. The coarse material will by this process be dropped nearest to the up-stream and down-stream faces of the dam and the finest, ultimately densest material will be crowded to the center. In the extreme case in which there is a scarcity of fine material it may be advisable to deliver only along the down-stream barrier in order that the finest material may be crowded as far toward the up-stream face as possible, thereby establishing the condition of greatest density up-stream and greatest perviousness near the down-stream face. From this condition to the other extreme of excessive amounts of clay there may be all manner of gradations. In broad terms the more material there is of the clay type which holds tenaciously to its moisture contents, and which may remain semi-liquid for a long time, the more important it is to flank the same with broad barriers of firm more or less pervious material, and to allow ample time for drainage. This requirement naturally leads to a concentration of the clayey materials at or near the central section of the dam which is being constructed by the hydraulic fill process and is apt to accentuate the elimination of coarse material from the clay, particularly in the broad lower layers of the dam where the points of discharge are farther away from the center than at higher elevations where the dam has less width.

Preponderance of clay in the borrow pit or, rather, the presence of clay in undesirable amount, will compel the exercise of good judgment in the direction of the work so that without sacrifice of imperviousness the pocketing of masses of material which will remain semi-liquid too long may be avoided. The direction of work in such a case relates not alone to a proper disposal of the sluiced material on the growing embankment but also to a selection in the pit of that which is best suited for use at each successive stage of progress.

Without Clay

Needless to say, the absolute imperviousness of an earth dam is not an essential attribute. We can readily imagine a dam, for example, constructed of material graded from coarse to fine but without clay in which the fine material in well compacted mass is near enough to the up-stream face and far enough from the down-stream face that it not only sufficiently checks the movement of moisture through the structure but also gets adequate support from the coarser material. Such a dam, on a suitable foundation, may, even with some leakage, be a perfectly safe and useful structure. In such a dam the line of saturation can not approach the down-stream face. There will be no danger of sloughing, provided of course that proper slopes have been adopted and saturation does not result from other causes such as excessive rainfall upon improperly drained surfaces.

The Drainage Problem

The draining out of the moisture to the surface of the clay mass while a dam is under construction and water is ponded on top will ordinarily be both downward and horizontally outward to the surface of the mass. The clay mass begins to dry, in other

ROBINSON CRUSOE was lonely—you'll be more so if everybody but you does their share toward winning the war—

BUY LIBERTY BONDS

words, from the outside. It shrinks in drying, thereby facilitating the movement of moisture from the interior toward the surface of the mass. This movement is the result of the forces of capillarity and of gravity. The greater the dimensions of the wet mass the larger will be the amount of water which must move from the interior to the outside through the outer layers of the mass and therefore the longer will the outer layer be kept wet and the slower will be the rate at which consolidation takes place. In the absence of definite experience in this matter the assumption would therefore appear reasonable that, consolidation will increase in larger proportion than in dealing with material rich in clay, the time for the width or height of the dam. The presence of clay, therefore, in the material of which a dam is being constructed may determine the rate of construction and perhaps, too, the height of the dam that under consideration of all circumstances could be recommended for construction by the hydraulic fill method.

Considerations in Use of Clay

The value of clay as a component part of a dam may be ascribed in large part to its property of swelling when absorbing moisture. A fairly dry compact mass of clay is exceptionally well suited to resist percolation. When its surface is wet as when water rises against a dam, it is probable that this property of swelling with resulting interior pressure prevents deep penetration of the water and accounts for the fact that, in the case of dams composed in part of clay or constructed with good clay puddle cores, absolute imperviousness can so frequently be claimed. But the drying of the clay to a reasonable degree of consolidation and compactness is necessary to put the clay into the condition in which it will properly perform its function and as a general proposition this condition should be obtained before drying is checked by submergence of one face of the dam as when a reservoir is brought into use too soon.

More information is needed relating to the effect of depth of deposit of wet clayey material on the unwatering of the lower layers. Is the upward progression of consolidation due solely to the decreasing rate at which water will flow downward through added depth of material as distance from the ponded water on the top of the dam increases? Or does the weight of the superincumbent material assist in pressing out the water from a confined mass of clay? And what is the relation of the rate of unwatering to depth below the top and to the horizontal distance from the sides of the clay fill?

Answers to these questions when they can be given will be of material service in defining the limitations which are under discussion.

Questions to be Settled

Without endeavoring to make the enumeration complete it may be suggested that among the factors which require special consideration, when the hydraulic fill method of constructing an earth dam is being studied are the following:

1. The suitability of the available material to make a practically water-tight dam when floated into place with water.
2. The relative cost of the hydraulic fill dam when compared with the cost of a dry fill dam.
3. The quality and relative amount of the fine material.
4. The physical properties of the fine material particularly in the matter of giving up the moisture of saturation when accumulated in large masses.
5. The possibility that throughout the mass of the dam local rates of drainage and consolidation will be variable, which may result in so pocketing saturated masses of material that drying out of these masses would be retarded.
6. The difficulty of ascertaining the degree of consolidation at all critical points.
7. The interference with drainage and consolidation by the use of the dam for the storage of water before consolidation is complete.
8. The probable settlement that will result from the shrinkage of drying clays.
9. The time required to construct and make available for use.

Hydraulic or Dry Fill

With reference to the construction of earth dams by the dry fill method it need only be said that when the foundation is suitable and materials are available the only limiting factor is cost.

There will be many cases, particularly in the West, where the suitability of the material for the construction of a hydraulic fill dam is unquestioned. When this is so the main factor to be considered will be the relative cost of the two methods of construction. Because this is occasionally decidedly in favor of the former it has made this type of earth dam deservedly popular.

Enough has been said to show that the difficulties of construction by the hydraulic fill method and the uncertainty of what is taking place in the matter of consolidation must increase with the volume of the deposited material. Consequently the problem of determining the method of construction becomes more difficult and grows with importance as the height of the dam increases. It becomes increasingly so when the proportional amount of clay is large and the consolidation will be correspondingly slow.

The Limitations

The use of the hydraulic fill method of constructing earth dams necessarily has its limitations. These limitations can not be defined other than in general terms. Each separate case presents its own problems. In this respect the hydraulic fill dam is on a par with other types of dams introduced at a comparatively recent day, but which have demonstrated their serviceability—such for example as the multiple arch dam—but which also have their limitations. The hydraulic fill dam has already made a place for itself. That this place will be more definitely delineated as further results of experience become available, goes without saying. It is too soon to say that the method is not suitable for any height of earth dam yet proposed.

THE CALAVERAS DAM BREAK

Although the hydraulic fill dam failed on this occasion, that is not necessarily a reason for condemning the type—and indeed hydraulic methods are being used to reconstruct the dam in this instance with greater precautions in testing the core.

SPARKS—Current Facts, Figures and Fancy

(A few of the facts behind the enormous expenditures which make necessary the Fourth Liberty Loan. We are spending money more rapidly than any nation in any war heretofore but in return we are getting a cleaner and better army, a more extensive merchant marine; we are better caring for our wounded and disabled and the product is worthy of the cost. Buy Liberty Bonds.—The Editor.)

The total resources of the United States are estimated at about $250,000,000,000; our annual earnings are estimated at about $50,000,000,000. You should count, in other words, on investing about one-seventh of your annual income in Liberty Bonds to do your share.

* * *

We are spending on the war fifty million dollars every twenty-four hours, or one billion dollars every twenty days. To provide the money for the coming Liberty Loan, every man, woman and child in the United States would have to buy at least one bond—and three-eighths of us would have to buy two.

* * *

Five hundred million dollars has been salvaged from the scrap heap in England during three years time, according to the Director of Supplies who has charge of the army salvage system. Our new ideals of conservation and saving waste products are making it possible for us to save more and to Buy Liberty Bonds.

* * *

The first Liberty Loan brought in $1,986,595,200 from 4,500,000 purchasers; 9,500,000 persons participated in the Second Liberty Loan, which realized $3,808,766,150, and there were 17,000,000 individual subscribers to the Third Liberty Loan, the total of which was $4,170,019,650. Congressman Nicholas Longworth of Ohio, in the House of Representatives the other day predicted that 30,000,000 Americans will subscribe to the Fourth Liberty Loan.

* * *

Perhaps none of the various uses to which the proceeds of the Liberty Loan are to be devoted appeals more strongly to the American people than the rehabilitation and re-education of our wounded men. Compensation will be allowed them and family allowances will be paid their families as if they were in actual service while they are taking the training, and every method known to science will be used to restore them to health and usefulness.

* * *

During the Mexican War, the annual death rate from disease among our troops was 100 men out of every thousand. During our Civil War, the rate was as high as 60 out of every thousand. During our Spanish-American War, it was 25 out of every thousand. Now the Surgeon-General's office reports that among our troops at home and abroad, the annual death rate from disease fluctuates from less than 2 per thousand to slightly more than 3 per thousand. The appropriation which supports our effective medical service is included in the budget of the Liberty Loan.

On July 1, 1916, we had no tonnage worthy of the name engaged in overseas trade. Up to June of this year we had built a tonnage of over 3,500,000 deadweight tons. Our program calls for the building of 1856 passenger, cargo, refrigerator ships and tankers, ranging from 5,000 to 12,000 tons each with an aggregate tonnage of 13,000,000 besides an auxiliary service of 650,000 deadweight tons. All this must be financed by the government from taxes and the sale of bonds.

* * *

Since the war began four years ago 43,000,000 men have been put under arms either in the armies or navies of the fighting nations while 8,700,000 men have been killed or died of wounds and disease. In all probability before the last battle is fought 10,000,000 soldiers will have been put into premature graves or their bones left on the battlefields never to be cared for. How many civilians, innocent noncombatants, men, women and children, have died can only be estimated, but the number must reach into the hundreds of thousands.

* * *

As an example of the calls upon the government which must be met, the report of the mushroom-like erection of a huge refrigerating plant in France is of interest. The encampment, which has for its special object the provisioning of American soldiers in France, covers a space of 10,000 acres. The refrigerating plant holds 10,400,000 pounds of meat, which is equivalent to 15,000 cattle weighing on the average 700 pounds apiece. It produces 500 tons of ice per day in excess of that used at the plant, which is used in refrigerator cars.

* * *

With six billions added to the war debt of the United States by the next Liberty Loan, the national debts of the larger belligerent countries will stand as follows:

	War debts.	Debts before the war.
The United States	$24,000,000,000	$ 973,000,000
Great Britain	37,000,000,000	3,000,000,000
France	29,500,000,000	6,000,000,000
Germany	34,700,000,000	2,200,000,000
Italy (partly estimated)	7,500,000,000	1,200,000,000

Part of the United States debt is loaned out to our allies and will be returned. But even at that, of course, it costs more to finance a war 5,000 miles away.

ESAU sold his birthright for a meal, but all we have to do is to postpone the present enjoyment and preserve our birthright—

BUY LIBERTY BONDS

THE VACUUM CLEANER —— THE VACUUM CLEANER

A driftwood fire makes a far more cheerful and delightful blaze than redwood planks, but fresh cut lumber is what is ordinarily used to build a house. There is many a bit of gossip washed up on the wave of the day's events which never gets into the main columns of the Journal of Electricity but eddies around on the surface of current conversation until it is eventually sucked into the capacious bag of the office Vacuum Cleaner. At the earnest plea of that electrical janitor, this page is given over into its control for the kindling of a blue green flame. —The Editor.

It took twenty years to collect the material which went into Professor Jo's article on snowfall and melting in the Sierras which appeared in the last issue of the Journal of Electricity—and for the last six years of that time, he has been collecting the data with the idea in mind of giving this information on stream flow to electrical men through these columns. This Professor Le Conte is the son of old Professor Jo of beloved geologic fame, by the way. Besides being Professor of Engineering Mechanics at the University of California, "Young" or "Pious" Jo is godfather to the Sierra Club and is usually to be found in the summer time tramping the Sierras with them. The plain truth is that this snow data was collected rather with a view to landscape and trail possibilities than in order to predict stream flow for the power plants—up to six years ago, that is, when the Editor suggested the article to him. That "Pious" title, incidentally, does not refer to a Sunday temperament but to the mathematical proclivities which young Jo displayed when he was a good deal younger, πr^2 being such a common formula with him that his class found the nickname.

The Spirit that oversubscribes the Liberty Loan is to be shown in the outburst of poetry which has deluged the Editor. Is the electrical fraternity unusually inclined to poetry or is this a common phenomenon of war time? Here is an extract from a sincerely earnest protest against the Kaiser written by an electrical contractor.

FOR LIBERTY

Hark! What is this I hear,
The call I've heard before—
My dear old gray-haired grandpa
Spoke of the canon's roar.
* * *
He spoke of Freedom—Liberty
Of the acts they said and done.
Said "This, my boy, oh God!
Are acts the whole world shun."

As Grandpa spoke these words so true,
My chest filled out with vim,
I knew that now the time had come
That also, we must win.

Then Grandpa gazed into my eyes,
In his throat there was a lump,
Said, "Boy, it must be done,
Try hard to stand the bump."

My hand I waved to loved ones,
As I heard the bugle's call,
Dressed in my colors of brown,
I was leaving—that was all.
* * *
Although I'm but one soldier
I'm strong as any man.
And that crooked one-armed Kaiser
I'll "get him" if I can.

Making Bricks Without Straw was the title of an article by a committee of the Pacific Coast Section N. E. L. A. on contractor-dealer problems 'way back in the April 15th issue of the Journal of Electricity. Of course, you recognized it as a quotation from Exodus concerning the actions of the Pharoahs in holding back straw from the Hebrews (it being labeled to that effect) but did you know why it was so difficult to make bricks without straw? A recent clipping which drifted into the office explains the matter. It is obvious that straw couldn't be of much use as a binding material like the hair in mortar, for the fibre is too weak. Here is the answer: "About fourteen years ago it was found that when clay is mixed with a dilute solution of tannin it becomes much more plastic, and the strength of the dried brick is, moreover, greatly increased. Although straw does not contain tannin, it was found that when straw is treated with water the extract obtained has the same action on clay as tannin has, the plasticity of the clay and the hardness of the brick being greatly increased."

On the Range is the title of this unexciting picture of W. R. Putnam—and it refers rather to the subject of his conversation than to the grassy wilds of the landscape. This range finder is a Minnesotan by birth, a—what is an inhabitant of Utah?—a Mormon by adoption and is chairman of the range committee of the Northwest Electric Light and Power Association which has its headquarters in Portland, Oregon. (See present and past issues of the Journal of Electricity for confirmation). Besides riding the range for one hobby, Putnam is a great believer in interesting the children and is to write a series of articles on that subject for the Journal of Electricity which will appear at an early date.

Speaking of the kiddies, here's a new series of wild electric beasties of special Vacuum Cleaner origin which ought to interest the children. Of course, the first is the "Vacuum Cleaner":

THE VACUUM CLEANER

Hark to the wail and oh! gaze at the tail
Of the wild Electricthyosaurus.
From morn until night he eats all that's in sight
As we should eat all that's before us.
But children, beware—for you would not care
To be known as a glutton.—The Chorus:
"O-o- oo-oo- wa-a-a- ooo-n-n-n-!"
Hear the vacuum cleaners call
As they range from stairs to hall.

THE VACUUM CLEANER —— THE VACUUM CLEANER

PERSONALS

J. R. Geary, for fifteen years the official representative of The General Electric Company in Japan, has during his recent visit to the Pacific Coast given most interesting and helpful talks on business conditions in Japan in their relation to the electrical industry both with China and America. In both his talk before the San Francisco Electrical Development League and the San Francisco Engineers' Club Mr. Geary showed a wonderful grasp of his subject and his earnest plea for the creation of closer engineering and commercial relations with Japan based upon an intimate knowledge of the Japanese viewpoint of American ideals will be re-echoed in many quarters of the commercial world in cementing closer relations between America and the Island Kingdom. Mr. Geary in company with his bride, left for Japan Sept. 27, 1918.

R. R. McLean, electrical engineer for the City Council of Melbourne, Australia, is a recent San Francisco visitor.

George Kuhrts, manager of the Los Angeles Electric Railways, recently spent several days in the central part of the state.

Guy Little, General Electric Company representative of Schenectady, N. Y., has been in San Francisco during the last week or so.

C. Tsukamoto, resident engineer of The General Electric Company with headquarters in Yokohama, Japan, is a recent San Francisco visitor.

George A. Campbell, manager of the Reno Gas & Electric Company, came to San Francisco to attend the meeting of the N. E. L. A. executive committee.

A. W. Eshelby, railway engineer for the Westinghouse Electric & Manufacturing Company, headquarters Seattle, was recently in Montana on a ten-day business trip.

W. C. Harvin is connected with the Pacific Portable Cement Company, Consolidated, San Francisco, California, as purchasing agent for the company, to succeed H. L. Groves.

George T. Bryant, formerly with the North Coast Electric Company of Seattle, has now joined the sales forces of the Economy Fuse Company with headquarters in San Francisco.

George N. Rooker, manager of the Mountain States Company at Sandpoint, Idaho, has been appointed chairman of the Bonner County Liberty Loan Campaign Committee for the Fourth Loan.

W. A. Brackenridge, president of the Southern California Edison Company of Los Angeles, was among the many electrical men of Southern California to visit San Francisco during the past two weeks.

Lyman G. Morgan is now connected with the Seattle office of the Western Electric Company. Mr. Morgan was formerly with the sales force of the National X-Ray Reflector Company, Milwaukee, Wis.

N. G. Campion, a consulting engineer of Manila, in connection with the sugar industry of the Philippine Islands, is a recent San Francisco visitor. Mr. Campion is manager of the Calamba Sugar Estate.

A. L. Menzin, a consulting mechanical engineer of Philadelphia, formerly with the Tracy Engineering Works in San Francisco, is a recent Pacific Coast visitor and is now stopping in Berkeley, California.

W. D. McDonald, district manager for the Westinghouse Electric & Manufacturing Company, Seattle, was in attendance at the annual meeting of district managers of that company recently held at East Pittsburg.

G. F. Morrison, vice-president of the General Electric Company with headquarters at Schenectady, N. Y., is a recent San Francisco visitor en route to Japan. Mrs. Morrison accompanies him on his trip to the Island Empire.

P. D. Wagoner has assumed the presidency of the Elliott-Fisher Company of Harrisburg, Pa. Mr. Wagoner was formerly associated with the General Vehicle Company for a number of years as president and general manager.

Fred A. Smith, former traffic chief for the Pacific Telephone & Telegraph Company, has been commissioned a second lieutenant of Field Artillery at Camp Zachary Taylor, Kentucky, according to word received by his friends here.

Sergeant Eric Unmack, of the San Francisco office of the Western Electric Company, has been ill in a hospital in France but in a recent letter says that he is getting along well and expects to be back with his regiment before long.

J. H. Fenton, of the Los Angeles office of the Westinghouse Electric & Manufacturing Company, has recently been appointed manager of the industrial division of that office, which includes jurisdiction over the Tucson and El Paso offices.

J. J. Agutter, president of J. J. Agutter & Company, 622 Fourth Avenue, Seattle, is spending a month at Camp Perry, Ohio, where he is taking training in small arms. He is one of three members of the Seattle Rifle and Revolver Association in attendance.

J. C. Clark, assistant professor of electrical engineering at Stanford University and chairman of the San Francisco Section of the American Institute of Electrical Engineers, has returned to his duties at Stanford after an absence of several months in the East, during which period he attended the annual convention of the Institute as representative of the San Francisco Section.

Garnett Young, president and general manager of Garnett Young & Company, a well known Pacific Coast distributing house, has been elected president of the San Francisco Electrical Development League. The new year for electrical activities in the San Francisco Bay region has already been ushered in by a rousing series of meetings during September, at which many noted men have attended and delivered interesting and helpful addresses. Much is in store for the coming months. The critical yet triumphant days ahead will unquestionably be fraught with perplexing and grave problems that must be met by men of the electrical industry with a hopeful and firm unity of purpose. It is believed by men who have for years followed the earnest and effective work of Mr. Young in his many activities of the industry that his term of office will be in full keeping with the splendid attainments of the past in the helpful work of the San Francisco Electrical Development League.

QUEEN ELIZABETH passed around grants of land in America but you don't want the Kaiser to try the same thing—

BUY LIBERTY BONDS

H. A. Joslin, district manager of the Oregon Power Company at Dallas, Oregon, has been appointed Farm Labor Agent by the Dallas Commercial Club, acting for the United States Labor Commission. Mr. Joslin has also been appointed vice-president of the Chamber of Commerce.

F. B. Tough, petroleum technologist of the U. S. Bureau of Mines, with headquarters in San Francisco, has returned to Illinois to continue cooperative work with the state officials and with officials of the State University in the matter of cementing oil wells in the southern fields of the state.

P. H. Booth, vice-president of the Edison Electric Appliance Company, Inc., with headquarters at Chicago, is a recent San Francisco visitor. Mr. Booth has been made Pacific Coast salesmanager of the company and will establish his office at Ontario, California, the home of the Hotpoint.

W. M. Deming, vice-president and general manager of the Technical Publishing Company, publishers of the Journal of Electricity, is a recent visitor at Portland, Seattle, and other cities in the Northwest. Mr. Deming took an active part in the recent sessions of the Oregon Association of Electrical Contractors and Dealers which have just closed at Portland,

C. F. Elwell, a prominent radio engineer of Paris, France, and a former well known engineer of California and a Stanford graduate, has just given to his alma mater the sum of $300, to be used by a worthy graduate student in electrical engineering. The university year begins October 1st. Persons interested are requested to communicate at once with Professor J. C. Clark, 151 Embarcadero Road, Palo Alto, California.

P. S. Klees, who has been with the Franklin Electric Company of New York City for the past twelve years, has just been made vice-president and salesmanager. He has long been a most active member of a number of the important committees in the lamp industry. Members of the electrical industry on the Pacific Coast will welcome the good news of the splendid new field of activity opened up to Mr. Klees in his recent appointment.

Isoji Ishiguro, perhaps the most distinguished engineer of the Japanese Empire, who has designed many of the greatest hydro-electric improvements of Japan and who devised the scheme for raising six sunken Russian cruisers after the Russo-Japanese war, has just returned from London on a mission for his government attending a trade conference of the allies. He is a guest at the Fairmont. Mr. Ishiguro is a life member of the Japanese Upper House of Parliament, receiving his appointment from the Emperor.

Dr. T. M. Putnam, dean of the lower division and associate professor of mathematics at the University of California, has been appointed chairman of the military and naval board at the University of California. Other members are James Sutton, recorder of the faculties, Dr. R. G. Sproule, assistant comptroller and Morse A. Cartwright, assistant to the president of the University. The University of California, typical of that splendid spirit of helpfulness now pervading all institutions of learning in the great West, is preparing to put over a campaign of patriotic accomplishment never before equaled in the annals of university life in the nation. So interwoven have become affairs electrical in the furthering of countless military achievements that the military work of western universities will be followed with keenest interest in coming months. The best wishes of all well wishers of the nation go with them in their patriotic endeavors.

F. G. Baum, consulting electrical enginneer, is again back at his San Francisco office after an extended visit to countries along the west coast of South America.

A. W. Ambrose, acting chief petroleum technologist of the U. S. Bureau of Mines, is spending a few weeks in California on investigations in connection with the work of the Bureau. **C. H. Beal,** petroleum technologist of the Bureau, is taking Mr. Ambrose's place during his absence from Washington.

Chas. W. Forbes, well known among telephone men of the West, who has been operating an exchange at Hermosillo, Mexico, is to leave for the United States, where he will make his home in San Francisco, Cal., for a time. He tried to get into the war, but a lame hand prevented him from being accepted.

Guy E. Tripp, formerly Colonel United States Army and Head of Production Division, has been made Brigadier General United States Army, and placed in offices having charge of the production of ordance material in their respective sections of the country. The District Chiefs will report direct to General Tripp, who is succeeded as Head of the Production Division by Colonel C. C. Jamieson. Previous to his connection with the Ordnance Department General Tripp was chairman of the board of directors, Westinghouse Electric & Manufacturing Company, with headquarters in New York.

Geo. L. Myers, secretary of the Northwest Electric Light and Power Association and assistant to the president of the Pacific Power & Light Company at Portland, has rendered valuable constructive service to the association during the past year. Mr. Myers came to Oregon in 1907 after engaging in newspaper work in South Dakota for some time. He was

clerk for the Oregon State Senate in the 1909 legislature. In 1910 he was in the office of the vice-president and general manager of the Oregon-Washington Railroad and in 1912 he entered the service of the Pacific Power & Light Company as assistant secretary and assistant treasurer of the company. Mr. Myers' close association with utility affairs in the Northwest and his quick, active discernment in analysis have won

for him a strong place in the affairs of the industry in that section of the West.

A. G. Wishon, of Fresno, general manager of the San Joaquin Light & Power Corporation; **H. H. Jones,** of San Diego, vice-president of the San Diego Consolidated Gas & Electric Company; **Samuel H. Kahn,** of Stockton, vice-president and general manager of the Western States Gas & Electric Company; **R. H. Ballard,** of Los Angeles, vice-president of the Southern California Edison Company; **E. R. Davis,** of Los Angeles, superintendent of the Southern California Edison Company; and **A. E. Wishon,** of Fresno, assistant general manager of the San Joaquin Light & Power Corporation, are among the many central station executives who have recently visited San Francisco.

W. H. Morton, formerly secretary of the National Electrical Contractors Association of the United States, has been appointed general manager of the reorganized National Association of Electrical Contractors and Dealers. General Manager Morton was present when the few contractors met in Buffalo back in 1901 for the purpose of organizing a national body. He was active in getting the contractors together for that first meeting and really was responsible in a large measure for the final organization of the National Association. Mr. Morton's new duties will be broader than those of former years in that he will be responsible for the conduct of all the work of the national organization in its enlarged field.

H. J. Hansen, formerly of the Electric Distribution Department of the Pacific Gas & Electric Company at Oakland, now with the 319 Regiment of Engineers at Camp Fremont, has been promoted to regimental supply sergeant, the next highest non-commissioned rank in the regiment. Among other employes of the Pacific Gas & Electric Company now in the service, **R. D. Likely,** formerly employed as operator in the Redwood District, has received a commission as lieutenant in the Aviation Corps of the American forces. He is now in England. **J. L. Fulton** has received a commission as lieutenant in the 42d Casual Corps, and is located at Camp Pike, Arkansas. **Merl W. Bremer,** formerly of Mr. Downing's office, has been advanced from second to first lieutenant. He is in Company A, 528th Service Battalion Engineers, and is now located at Camp Dodge, Iowa.

J. B. McLean, of Los Angeles, commercial engineer of the Southern California Edison Company; **H. L. Barre,** of Los Angeles, electrical engineer of the Southern California Edison Company; **Chas. Gilcrist,** of Fresno, meter engineer for the San Joaquin Light & Power Corporation; **I. W. Alexander,** of Fresno, commercial engineer of the San Joaquin Light & Power Corporation; **P. M. Wentworth,** of Reno, purchasing agent of Truckee River General Electric Company, and **J. G. Pomeroy,** an electrical supply jobber of Los Angeles are among recent business visitors in San Francisco.

J. M. Wadsworth, petroleum engineer for the United States Bureau of Mines, has been appointed State Administrative Engineer for the California Fuel Administration, as announced officially by Albert E. Schwabacher. Mr. Wadsworth has already been giving part time service to this work and now his services have been loaned by the Bureau of Mines for the duration of the war. He will conduct a campaign for fuel conservation among the principal plants burning oil, coal, natural gas or coke. **Prof. C. N. Cross,** who has been associated with Mr. Wadsworth in this work, will return to Stanford University on the first of October. **C. P. Bowie,** recently returned from a trip to Colorado, and **Earl Wagy** have also been loaned by the Bureau of Mines to the Fuel Administration to assist in efficiency work in the fuel oil burning power plants of California.

OBITUARY

Joseph Parkin, a resident of Washington for the past thirty years, died at his home at 1704 36th Avenue, Seattle, recently. Mr. Parkin was 54 years old. He was an electrical engineer and for some time prior to a year ago was one of the receivers of the old Seattle, Renton & Southern Railway. For thirteen years he was located at Fort Worden, Washington, where he had charge of the electrical property of the Government, and was connected with other important electrical work in the state.

Frank A. Harmon, general manager of the Eastern Oregon Light & Power Company, passed away at his home in Baker, Oregon, Sept. 12, 1918. Mr. Harmon has long been associated with leaders of the power industry in the Northwest where his loss is deeply felt. At the recent one day session of the Northwest Electric Light & Power Association resolutions bemoaning his death were passed by the delegates in attendance. Receiving but a common school education Mr. Harmon, who had lost his right arm at the age of 17, started in life as a telegraph operator in the employ of the Chicago and Northwestern Railway. He rose rapidly, however, in the railroad business, becoming agent, division freight agent and division superintendent. Later he engaged in the banking business at Shoshone, Wyo. From 1908 until the present time he has occupied the position of secretary and general manager of the Eastern Oregon Light & Power Company, whose general offices are in Baker, Oregon. His loss is deeply deplored by all who knew him.

GOVERNMENT OPENINGS

Signal Corps School for Radio Electricians —

A thirteen weeks' course for radio electricians has been established by the Government at the University of California. The total enrollment of this school will be three hundred men, admission to take place in groups of one hundred monthly. The first contingent is expected about October 15. Admission to the school is limited to enlisted men sent to the University either by the draft boards or by detachment commanders of the army.

LIBERTY LOAN FACTS

The Fourth Liberty Loan will call for an amount equal to all the money in the United States, which, on Sept. 1, totaled $5,621,311,000. Circulation per capita is now $52.95, or $6.99 more than on Sept. 1, 1917.

We have nearly two million men in France.

For artillery, automatic rifles, and small arms, and for amunition for them, we have spent over $3,700,000,000.

We have spent over $120,000,000 just for staple supplies for our army, such as flour, bacon, rice, etc.

We have spent over $500,000,000 to clothe our soldiers.

HENRY FORD has proved that success is not dependent on the looks of a thing so much as how it goes. You look patriotic—now

BUY LIBERTY BONDS

MEETING NOTICES FOR ELECTRICAL MEN

(A rousing meeting of the Cooperative Campaign forces of California is planned in Los Angeles. Contractor-dealer conventions have made history in the Northwest—A joint engineering meeting and an interesting plan for foreign trade courses—Local meetings of interest.—The Editor.)

California Cooperative Campaign Dinner

A general get-together meeting of all electrical interests is planned for the California Electrical Cooperative Campaign Dinner to be held at Hamburger's Cafe—4th floor—8th and Broadway, Los Angeles. Problems and opportunities of today will form the general subject matter of the discussion—and it is expected that this will prove the most important electrical gathering ever held in this section. The program will be:

LOS ANGELES MEETING PROGRAM

L. H. Newbert—The Co-operative Campaign and Its New Problem.
A. E. Wishon—The Central Station Problem Today.
D. E. Harris—War Industries Board Rulings Affecting Our Industry.
R. M. Alvord—The Present Importance of Association Work.
A. H. Halloran—The Pacific Coast Section N. E. L. A.
G. B. McLean—The Proposed Advertising Campaign.
M. L. Scobey—How the Electrical Dealer Can Meet War Conditions.
G. Arbogast—Today's Opportunities for Electrical Contractors.

It is further hoped that S. M. Kennedy may be present and address the meeting. R. H. Ballard has consented to act as toastmaster.

Oregon Association of Electrical Contractors and Dealers

The annual meeting of the Oregon Association of Electrical Contractors and Dealers was held at Portland, Oregon, September 20 and 21, 1918.

The meeting was opened by a dinner at the Multnomah Hotel followed by a general business meeting on the evening of Sept. 20th. Saturday morning was devoted to papers on subjects of importance among- which the fol lowing are to be particularly noted: "Electrical Retail Merchandising," by B. W. Paul; "Priorities and War Industries Program," by Hon. Charles H. Carey, State Chairman War Industries Board; "Observations of a Jobber," by Geo. L. Oman, Vice-President and Northwest Manager of the Pacific States Electric Company, and "Turnover, as It Affects Profits," by C. P. Scott. The afternoon was spent in an auto ride pleasantly closed by a banquet at the Crown Point Chalet, followed by a dance and entertainment.

The San Francisco Electrical Development League

The meeting of the San Francisco Electrical Development League for Wednesday luncheon at the Palace Hotel, Sept. 18, 1918, proved unusually interesting.

Robert Sibley, editor of the Journal of Electricity, as chairman of the nominating committee reported the following nominees for League officers for the forthcoming season, which were enthusiastically and unanimously elected:

President—Garnett Young, president and general manager Garnett Young & Company.
First Vice-President—Harry Bostwick, manager San Francisco District, Pacific Gas & Electric Company.
Second Vice-President—E. O. Shreve, San Francisco manager of the General Electric Company.
Secretary-Treasurer—J. W. Redpath, secretary California Association of Electrical Contractors and Dealers.
Executive Committee—D. E. Harris, salesmanager Pacific States Electric Company; J. F. Pollard, commercial manager Sierra & San Francisco Power Company; Frank Rieber, chief engineer Rieber Laboratories; Tom Bennett, general manager Rex Electric Company.

The program of the day consisted in an address by J. R. Geary, representative of the General Electric Company in Japan for the past fifteen years. Mr. Geary discussed the Japanese situation in its relation to the United States, to China, and to the war. He spoke in such an earnest and convincing manner that it is believed as his words are disseminated throughout the nation, they will be a strong factor in furthering to an even higher degree the splendid spirit of confidence and mutually friendly understanding that already exists between America and her great ally in the Far East.

The September 25th meeting of the League was Ladies' Day and a goodly number of wives and sisters added their presence to the interest of the meeting.

The Joint Engineering Meetings

The first of the series of joint meetings planned for the San Francisco bay region was successfully carried out on the evening of Sept. 26th. The program as given in the last issue of the Journal of Electricity was one of great interest and the importance of the subject of "Fuel Conservation" brought out a large attendance. The next joint meeting is planned for the evening of Friday, October 25th at 7 o'clock in the rooms of the Engineers' Club, San Francisco. It is to be under the auspices of the San Francisco Section A. I. E. E. and will cover the subject of "Unification." Among other notable short papers, the question of the "Unification of Competitive Telephone Systems in Los Angeles" will be considered by D. E. Wiseman, equipment engineer with the Pacific Telephone & Telegraph Company, and Wm. G. Sproule, western divisional manager of the Federal Railroad Administration, will speak on the "Unification of Railways." The meeting will begin promptly and adjourn at 9:30 without motion.

Toronto Meeting of Contractors and Dealers

Final arrangements have now been made for the meeting of the National Executive Committee of the National Association of Electrical Contractors and Dealers in Toronto on Monday, Tuesday and Wednesday, October 14, 15, 16. The meeting will be held at the King Edward Hotel, Toronto, and will be open to all branches of the industry.

BUILDERS OF THE WEST—XXXVII

LUTHER BURBANK

While the last score of years has witnessed in the West the harnessing of water-power and its transmission over mountains and across deserts to a degree, both in length of transmission and daring involved, hitherto unequaled among the engineering feats of the world, agriculture, too, has seen similar wonders in progress and in human achievement. To Luther Burbank of Santa Rosa, California—the wizard of the soil—this issue of the Journal of Electricity is affectionately dedicated in appreciation of the splendid new and useful creations in the products of agriculture he has brought to life through years of devoted service in its behalf.

At a dinner to be held on Monday night at the King Edward Hotel, W. L. Goodwin will explain his now famous plan of coordinating the various elements in the electrical industry, having in view better merchandising, better general conditions and a greatly extended use of electricity and electrical appliances of every kind. It is expected that this dinner will be attended by every electrical man in Toronto and that large numbers will also come in from outlying points.

Foreign Trade Club Course of Lectures

The first of the proposed course of lectures had been planned by the Education Committee of the Foreign Trade Club to start early in October and it had been hoped to secure Dr. W. E. Aughinbaugh for the opening address early during that month.

It now develops, however, that the Doctor must be in the East October 2nd and the committee therefore arranged for him to address the club on Wednesday evening, September 25, 1918, at 8 o'clock p.m. The subject was "Principles of Foreign Trade Surveying," being an analysis of things necessary to develop our foreign trade. The usual supper was held at Gus Fashion restaurant, 65 Post street, at 6:30 p.m., and seats in the hall were reserved for members until 8 o'clock p.m., after which the waiting public was admitted.

Dr. Aughinbaugh occupies the chair of Foreign Trade at the New York University, is the Export Editor of the New York Commercial, has traveled extensively and is a national authority on foreign trade.

Washington Electrical Contractors and Dealers

The Washington Association of Electrical Contractors and Dealers held its third annual convention at Seattle, September 12, 1918.

The chief question considered by the convention was the matter of joining the national association and a motion was made "That the Washington Association of Electrical Contractors and Dealers join the National Association of Electrical Contractors and Dealers and that it shall take effect the first day of October following this meeting." This motion was amended to the effect that the constitution provided by the national association be adopted with the amendment that it be made to conform to the constitution and by-laws of the Washington association, and further amended by the adoption of the proviso that all members of the Washington association in good standing would become members of the national association. Original motion and amendments carried.

At the election of officers, V. S. McKenny of NePage, McKenny Company, electrical engineers and contractors, Seattle, was re-elected president. For the Seattle district J. J. Agutter, W. M. Meacham and S. G. Hepler were elected vice-presidents; M. V. Burr and J. R. Mitchell vice-presidents for the Spokane district; J. L. Pegram, vice-president for the Bellingham district and H. F. DeWeese for the Tacoma district.

These officials constituting the executive committee, redistricted Chelan county, distributing it to the Yakima district, and F. E. Smallidge of Wenatchee was made vice-president of this district.

The executive committee selected Forrest E. Smith of Seattle as secretary-treasurer to succeed H. D. Allison of Seattle, who retires after three years of service with the association.

Secretary Allison submitted a financial statement showing the financial affairs of the organization in a very gratifying condition.

The attendance was not large as usual but was well distributed over the state.

British Columbia having also adopted the plan of the national association, all organizations of this nature on the Pacific Coast are now members of the parent body.

B. C. Association of Electrical Contractors and Dealers

On the 13th and 14th of September, the British Columbia Association of Electrical Contractors and Dealers held a very successful Annual Meeting at Victoria, B. C.

The Vancouver members and their friends left by the morning boat for Victoria, and were met at the C. P. R. wharf by the Victoria members and the visiting delegates from Portland and Seattle.

Headquarters were at the Empress Hotel, from whence a trip by motors was taken to the Observatory where Dr. Plaskett gave a very interesting account of the "greatest telescope in the world" and its workings.

From thence the party motored to the Brentwood Plant of the B. C. E. Ry. Co., inspecting it under the guidance of Mr. Halls, the sales manager, who performed his duties in a delightful manner.

An excellent supper was then enjoyed by the company. The toastmaster, E. C. Hayward of Victoria, carried out his duties in his usually efficient way, commencing with the toasts of the King, the President of the United States, and Our Allies; introducing Mr. Halls to give the visitors to Vancouver Island an address of welcome. Songs and choruses were then indulged in, closing with the National Anthems of the Allies. The B. C. E. Ry. Co, kindly provided a special car (gratis) for the return to Victoria.

The next morning saw a large gathering assembled in the Empress Hotel for the business meeting. The result of the annual election produced the following officers: E. Brettell, Vancouver, for President; C. Moulton, New Westminster, 1st Vice President; W. Richardson, Vancouver, 2nd V. P.; P. F. Letts, Vancouver, 3rd V. P.; E. C. Hayward, Victoria, V. P. for Victoria Chapter.

As a mark of the excellent work performed by the retiring president, Mr. C. H. E. Willams, during his more than two years of office as president, he received the grateful thanks of the association and was appointed ex-officio member of the executive committee for the ensuing year.

Mr. James Angus, on retiring from business in Vancouver, was granted permission to resign his membership, receiving the cordial thanks of the members for the excellent services he had rendered as a member. In replying he stated that he would perform "missionary" work while in California, with the purpose of inducing electrical men everywhere to join associations similar to ours. In order to assist him in the good work, he was elected an honorary life member of the association.

Next came a lengthy and earnest discussion on affiliation with the national association, in which the visiting delegates took a large part, with the result that affiliation was decided on, with date of 1st October next.

The meeting was followed by a luncheon at the Empress Hotel. After the loyal toasts were honored, the speaker of the day, R. F. Hayward, Esq., general manager Western Power Company of Canada, gave a very forcible and interesting address in which he spoke of the progress and greater expected development after the war. He emphasized the necessity of following the great example of Marshal Foch, who set himself an "objective" or goal to secure.

An enviable launch trip up the Gorge, with refreshments at the Japanese tea gardens, terminated a very successful gathering.

The British Columbia Electric Railway Company paid a very graceful compliment to the electrical visitors, in caus-

ALADDIN'S WIFE didn't know a good thing when she saw one, but you know this is a good business proposition—

BUY LIBERTY BONDS

ing the stately Parliament Buildings to be electrically illuminated both nights.

The visiting delegates, Messrs. Jaggars and Sroufe, from Portland, and NePage, Van Riper, Cooley and Worth, from Seattle, in addition to being of great social value were of great help to the association in clearing up many points in connection with affiliation with the national association.

Specially gratifying features of the attendance were the large representation from the wholesale houses, every firm being well represented; the goodly number of electrical inspectors, and the presence of electrical visitors from distant cities, such as Mr. Fulton from Montreal and Mr. Rowe from Penticton.

At the conclusion of the business meeting, wires were despatched announcing the affiliation with the national association, to the chairman of the national association, and to Messrs. Kenneth Macintyre (president of Toronto Association), and Wm. L. Goodwin (of the "Goodwin Plan").

PLANS OF THE PACIFIC COAST SECTION, N. E. L. A.

The Executive Committee

That much work has been accomplished by the officers and committees of the Pacific Coast Section of the National Electric Light Association since the Del Monte convention in May was made evident at a well-attended meeting of the Executive Committee held in San Francisco on Sept. 20th. Among the more important results was confirmation of appointment of several committees, perfection of plans for securing more active interest of present and prospective members, reception of a comprehensive plan for a publicity bureau, selection of Coronado Beach as the 1919 meeting place and announcement that the National Association had made an emergency appropriation of $2,000 to care for special work that the Section has in hand.

This $2,000 appropriation is the result of the Secretary's attendance at the national convention at Atlantic City in June, when the association was asked to refund half of the percentage dues paid by Class A members and also to arrange for granting greater powers and duties of self-government to geographic sections. No decision has yet been reached by the specially appointed committee but the immediate needs of the Section were met by this appropriation. The Executive Committee accepted the amount and will continue its efforts to secure greater recognition of the geographic section.

The report of Treasurer J. F. Pollard showed ample funds to meet this year's budget requirements and also that Robert Sibley, as chairman of the Del Monte convention committee, had returned $103.57 as a surplus after paying all expenses connected with the convention. His recommendation that this be made a special fund as a nucleus for the next convention fund was adopted, a vote of thanks and appreciation being extended to Mr. Sibley and to the Journal of Electricity.

Following the suggestion of Henry Bostwick, chairman of the Membership Committee, it was decided to hold several get-together dinners throughout the year and also that the members be mailed monthly announcement cards regarding association activities. A special invitation is extended to all members to be present at the California Cooperative Electrical Campaign dinner at Los Angeles on Oct. 4th.

The Membership Committee will offer several prizes in war savings stamps for the best suggestions on how to increase the value of the association to individual members, thereby retaining old members and inducing new members to join. Details will be announced later.

The Publicity Committee's report suggesting the formation of a Publicity Bureau was referred to the Public Policy Committee for recommendation as to action.

President Kahn announced the appointment of the following committees:

ENGINEERING COMMITTEE

H. A. Barre, Southern California Edison Company, Chairman
J. E. Woodbridge, Sierra & San Francisco Power Company
J. P. Jollyman, Pacific Gas & Electric Company
J. A. Koontz, Great Western Power Company
J. E. Cunningham, Southern California Edison Company
L. M. Klauber, San Diego Cons. Gas & Electric Company
C. P. Poole, Southern Sierras Power Company
W. C. Hornberger, Pacific Gas & Electric Company, Phoenix
S. J. Lisberger, Pacific Gas & Electric Company, San Francisco
E. R. Northmore, Los Angeles Gas & Electric Company
P. M. Wentworth, Truckee River General Electric Company
M. E. DeFrance, Deming Ice & Electric Company, Deming, N. M.

COMMERCIAL COMMITTEE

E. B. Walthall, San Joaquin Light & Power Corp., Fresno, Chairman
W. S. Berry, Western Electric Company, San Francisco
W. L. Frost, Southern California Edison Company, Los Angeles
C. M. Brewer, Western States Gas & Electric Company, Richmond
J. O. Case, General Electric Company, Los Angeles
J. B. Black, Great Western Power Company, San Francisco
G. B. Egleston, Coast Counties Gas & Electric Company, San Francisco
H. J. Kister, Los Angeles Gas & Electric Corp., Los Angeles
P. M. Wentworth, Truckee River General Electric Company, Reno
H. H. Courtwright, Valley Electrical Supply Co., Fresno
T. W. Simpson, Federal Sign Company, San Francisco
C. Remschel, Southern Sierras Power Company, Riverside.
C. M. Einhart, Roswell Gas & Electric Company, Roswell, N. M.
F. A. Leach, Jr., Pacific Gas & Electric Company, Oakland
R. F. Behan, Westinghouse Electric & Manufacturing Co., San Francisco
C. S. Northcutt, Sierra & San Francisco Power Company, San Francisco
L. H. Newbert, Pacific Gas & Electric Company, San Francisco

PUBLICITY COMMITTEE

Ed. Whaley, Northern California Power Company, Chairman
Charles Pierson, Southern California Edison Company, Los Angeles
H. A. Lemmon, Truckee River General Electric Company, Reno, Nev.
F. S. Myrtle, Pacific Gas & Electric Company, San Francisco
I. W. Alexander, San Joaquin Light & Power Corp., Fresno
A. E. Holloway, San Diego Cons. Gas & Electric Corp., San Diego
Mr. Hodge, Byllesby & Company, Chicago

H. H. Jones' invitation to the association to hold its 1919 convention at Coronado Beach was accepted contingent upon securing reasonable rates and an assurance of ample accommodations.

Present at the meeting were: President Samuel Kahn, Henry Bostwick, E. R. Davis, A. E. Wishon, D. E. Harris, H. H. Jones, J. B. Black, J. F. Pollard, Secretary A. H. Halloran.

Engineering Committee

Chairman H. A. Barre called meetings of the Engineering Committee at Los Angeles Sept. 18th and at San Francisco Sept. 23rd, plans being outlined for committee activities to culminate in various reports and discussions at the Coronado convention.

J. E. Woodbridge of San Francisco was made chairman of a sub-committee to arrange for an interchange of expert personnel for special work required by various member companies. This includes such men as cable splicers, transformer repairmen, turbine rebladers and welders, all of whom are not regularly employed at their specialties and might be available for other companies. The success of this plan depends upon the cooperation of the member companies.

H. N. Sessions of Los Angeles was selected to handle an interchange of apparatus stock lists between different companies. The thought is that some companies have equipment out of service which might be of value to others.

Convention reports will include record of action on insulator testing, standardization of transformers, power interchange and other topics having to do with winning the war.

Present at San Francisco were Chairman H. A. Barre, J. E. Woodbridge, P. W. Wentworth, J. A. Koontz, E. A. Quinn, S. J. Lisberger and A. H. Halloran.

The Illuminating Engineering Society

The annual convention of the Illuminating Engineering Society will be held this year in the Engineering Societies Building in New York City on October 10th. The entire technical program will be confined to one day instead of four days as was the custom before the war. All presentations and discussions will therefore be in condensed form. The evening of October 10th will be given over to a dinner-meeting at which speakers of national prominence will discuss questions pertaining to the war and illumination.

The representatives of the Illuminating Engineering Society in the West are:

San Francisco—Romaine W. Myers, Bacon Bldg., Oakland. Los Angeles—C. M. Masson, Edison Bldg., Los Angeles. Portland—F. H. Murphy, Portland Railway, Light & Power Company, Electric Bldg., Portland. Salt Lake City—W. R. Putnam, Utah Power & Light Company, Salt Lake City. Seattle—Fred A. Osborn, University of Washington.

HAPPENINGS IN THE INDUSTRY

FUEL CONSERVATION IN THE WEST

BY ALBERT SCHWABACHER

The solution of America's war problem is dependent upon her fuel problem. Fuel is the driving force of war, and must be made available in sufficient quantities to insure victory. The two limiting factors to the production of coal are labor and transportation. Coal cannot be stored at the mines because of the danger of spontaneous combustion. If mine laborers are not fully employed during the summer months, they seek other occupations.

The Fuel Administration's "Buy Early" coal campaign has increased the demand at the mines during the summer months, and in this way the labor supply is available during fall and winter when demands are abnormal.

Oil must also be conserved, and the demands for fuel oil for our new merchant marine are enormous. An equal weight of fuel oil as compared with coal will give more heat, no smoke, requires less man power to handle it, and as a ship fuel occupies much less bunker space.

The Fuel Administration in efforts to make available fuel in sufficient quantities for our war industries and transportation companies, has in conjunction with the War Industries Board, curtailed the following less essential industries. Percentages are given:

Beer making and cereal beverages	50%	curtailment
Clay products, including face brick, common brick, pavement brick, terra cotta, roofing tile, floor and wall tile, sanitary ware ..... Each	50%	"
Restriction of hollow tile, drain tile, sewer pipe.... Each	25%	"
Stone ware (except chemical)	15%	"
Pleasure automobiles	75%	"
Private yachts are granted no fuel.		
Florists	50%	"
Glass makers	50%	"
Automatic machine bottle manufacturers	15%	"
Musical instruments	50%	"
Phonograph records	70%	"
Cement manufacturers	25%	"

Lightless Nights are estimated to save 500,000 tons of coal or fuel oil equivalent per annum. Skip Stop Systems on street railroads promise to save 3% fuel consumption. Daylight saving plan will save approximately one and one-half million tons of coal or fuel oil equivalent per annum.

Conservation of electric power by the American people is strongly urged. Every power plant in the country is being inspected by the Fuel Administration, and rated according to efficiency. It is hoped to save fifty million tons of coal or fuel oil equivalent through increased power plant efficiency. Savings of from ten to thirty-five per cent in fuel consumption by economical lighting, rearrangement of machines and shafting, and curtailment of elevator service, maintenance of even temperature in factories, and covering of steam pipes, is now being accomplished.

With only slight expenditures big results can be obtained. The elimination of unnecessary lights, elimination of lights of too great candle power, of carbon lamps and arc lamps, the substitution of nitrogen lamps, the elimination of dirty windows so as to allow sunlight to enter. The discontinuance of motor power when machinery is idle, elimination of excessive sparking, heating or erratic speed of motors. Proper alignment of shafting, grouping of machines so as to operate motors as nearly loaded as possible, and efforts to maintain as flat a load curve as possible. Generating units can be shut down to take care of peaks by proper studies of load curves. Inter-connection of power companies, especially in communities where water power is available, is being urged.

Domestic consumers are urged to save fuel in their homes. Most of this saving can be accomplished by proper damper control. The flow of air through the fuel makes it burn, and householders should learn to control it. By rigid curtailment in homes and in factories, ample supplies of raw material, fuel and transportation will be provided for necessary war industries. Conservation throughout the country is a self-evident necessity. More radical curtailment than ever before of the supply of fuel to industries is essential to carrying on of the war, and must be enforced.

CHRISTMAS SHOPPING AGREEMENT

An understanding has been reached with the Council of National Defense by manufacturers of and dealers in goods sold to the Christmas trade with respect to holiday buying this year. The six rules laid down for the retail trade to follow are given:

Retail interests are not to increase their working forces by reason of the ordinary business over the average forces employed during the year.

Normal working hours will not be lengthened during the Christmas season.

Retailers will use their utmost efforts to confine Christmas giving, except for young children, to useful articles.

Every effort will be made to spread the period for holiday purchasing over the months of October, November and December.

Deliveries will be restricted and customers will be asked to carry their own packages wherever possible.

Announcements of the new policy will be made by retailers in their newspaper advertisements.

REVISION OF NATIONAL ELECTRICAL SAFETY CODE

The present edition of the National Electrical Safety Code designated as Circular No. 54 of the Bureau of Standards has been exhausted and before reprinting, the text of the rules will be revised. This revision is now under way and the Bureau of Standards is anxious to secure from all interested parties comments and suggestions for change of or for additions to the present rules which will improve them. Changes to be adopted must be such as will reduce accident hazards and must be reasonable and practicable. They should be supported by citation of specific instances or other evidence when possible, and should be addressed to the Bureau of Standards, Washington, D. C.

A list of proposed changes to Part 3 of the Safety Code has already been prepared and copies have been sent to the committees of technical and utility associations, state commissions and others who have been cooperating with the Bureau in the formulation and revision of the rules. Similar lists of proposals for the other parts of the Code are now being prepared.

SEATTLE BUYS CAR LINES

The offer of the city of Seattle to purchase the street car lines of the Puget Sound Traction Light & Power Company in the city at $15,000,000 has been accepted and details are being worked out with a view of making complete transfer by October 1st. The understanding of the traction company is that the offer includes all the street car operating property and car barns and yards except the property at Seventh avenue and Olive street containing the seven-story building in which the business of the company is conducted and approximately a block of ground.

The power agreement provides that the traction company shall sell to the city current to operate the street car system at 1 cent a kilowatt until October 1, 1923. If the Skagit River power plant is not finished at that time the power contract may be renewed. If the Skagit plant is completed at that time the city is to take over the load at intervals in blocks of 5,000 kilowatts. As the city takes over the power load the substations of the traction company used in

GEORGE WASHINGTON never told a lie—but he could have told one of the kaiser's lies a mile off when the kaiser claimed Americans would never support the war—

BUY LIBERTY BONDS

connection with street car operation are to be purchased by the city.

The mayor and city officials have sent a telegram to Ford, Bacon & Davis, traction accountants of San Francisco, asking that firm to come to Seattle to assist in checking up the property in order to segregate the light and power interests of the car system.

In the meantime W. E. Sampsell of Chicago, president of the Seattle & Rainier Valley Railway, operating several miles of street railway in the city, has arrived at Seattle with a view to making a sale of the line to the city. The matter has not progressed far as yet and no meeting has been arranged by the council with Sampsell.

Payment for the property of the Puget Sound Traction Light & Power Company by the city is to be made in twenty-year five per cent utility bonds.

COUNCIL OF DEFENSE TO PASS ON BUILDING

The War Industries Board has asked the State councils of defense to act as its representatives in passing upon proposed construction, in order that all building which is not absolutely necessary may be stopped. This is part of the new plan of the War Industries Board, by which permits from the board will be required for construction projects, as specified in circular No. 21. Permits are required for all new construction projects, with a few exceptions relating principally to Government work.

INCREASE IN ELECTRICAL ENTERPRISES IN JAPAN

According to investigations made by the Japanese Department of Agriculture and Commerce, the electrical enterprises existing in Japan in the month of April, 1918, were as follows: Electric-power supply companies, 597 enterprises, with a capitalization of 362,107,209 yen (about $181,000,000); electric railways, 42, with a capitalization of 43,749,969 yen (about $22,000,000); and combined power and railway companies, 48, with a capitalization of 324,786,691 yen (about $162,000,000). The total number of electrical enterprises is 687, with a capitalization of 739,643,869 yen (about $365,000,000), which, compared with the same date of last year, shows an increase of 39 enterprises with a capitalization of 65,191,470 yen.

Electric generating power is as follows: Water power, 416,385 kilowatts completed and 317,131 kilowatts uncompleted; steam power, 118,968 kilowatts completed and 158,759 kilowatts uncompleted. The total is 1,011,183 kilowatts, which compared with the same date last year, shows an increase of 156,330 kilowatts; that is, 73,184 kilowatts for water power and 83,146 kilowatts for steam power. Furthermore, new enterprises whose establishments were officially chartered during the same month numbered 6, of 2,212 kilowatts, with a capitalization of 1,286,300 yen. Two enterprises of 58.5 kilowatts, with a capitalization of 112,500 yen, have just been officially chartered.

GROWTH OF TRADE BETWEEN THE UNITED STATES AND LATIN AMERICA

The total trade between the United States and the twenty Latin American countries showed during the fiscal year 1917-18 just closed the extraordinary increase of one billion dollars over that of 1913-14, the last fiscal year before the outbreak of the war. The reports for individual countries are equally impressive. United States trade with Chile in the same period jumped from $43,000,000 to $205,000,000, or 375 per cent; Argentina, from $90,000,000 to $305,000,000, or 240 per cent; Cuba, from $200,000,000 to $500,000,000, or 150 per cent; Mexico, from $132,000,000 to $248,000,000, or 90 per cent; Brazil, from $130,000,000 to $190,000,000, or 46 per cent.

These figures emphasize the vast importance and possibilities of Pan-American commerce, but they must not encourage false hopes as to United States trade of the future. This exceptional growth is due largely to, first, the supplanting by the United States of the trade of the Central Allies; second, the caring by the United States for that portion of the trade of Great Britain, France, Belgium, Italy, and of Holland and other neutrals, for which they themselves, under war conditions, could not possibly provide; third, the heavy war demands of the United States and the Allies expressed through the United States for the raw products of Latin America, and the war demands of the latter for such manufactured products of the United States as were formerly obtained from Europe in considerable quantities.

TRADE NOTES

New Representative —

C. F. Henderson, Call Building, San Francisco, will hereafter have charge of the business of the Electric Controller & Manufacturing Company for the northern half of the state of California.

New Business —

The Standard Electric Company, 73 Horton street, Seattle, is installing new lighting equipment in the machine shops of the Washington Iron Works, a large local plant. A new alternator will be included.

War Retrenchment —

The Hotpoint Division of the Edison Electric Appliance Company has announced the discontinuance of the manufacture of the Model M Aluminum Cleaner and Attachments in order to conserve aluminum. They have further withdrawn their Exchange Proposition for the period of the war, and urgently request distributors to cooperate with the wish of the government to repair defective heating devices and thus keep them in active service rather than replace them by exchanging for new equipment. A revision of list prices and discounts is also announced.

MEASURING ANTENNAE CONSTANTS

A Letter to the Editor

San Francisco, Sept. 19, 1918.

Editor Journal of Electricity,

Dear Sir: Referring to the article on "A Method of Measuring Antennae Constants" by Mr. Walter Haynes, in the "Journal" for Sept. 15, 1918, page 268, an even simpler method is described in Circular No. 74 of the Bureau of Standards, page 84, which is as follows:

Instead of using an auxiliary condenser C, as described by Mr. Haynes, values of La and Ca can be determined from his equations (1) and (3) by using the measured values of the wave-lengths λ_1 and λ_2. By algebraic transformation from equations (1) and (3) we have

$$La = \frac{L_1 \lambda_2^2 - L_2 \lambda_1^2}{\lambda_1^2 - \lambda_2^2}$$

and

$$Ca = \frac{\lambda_1^2 - \lambda_2^2}{K_2 (L_1 - L_2)}$$

When L is expressed in millihenrys and C in microfarads $K = 59570$.

Mr. Haynes' method involves two additional observations, and substitutes condenser values in place of the wavemeter indications.

In equations (1) and (5) in Mr. Haynes's article, erroneous subscripts appear; L_2 should be La in (1) and L_2 and C_2 should be L_1 and C_1, respectively, in (5). The expressions given for La and Ca appear correctly.

Respectfully,

D. I. CONE.

LATEST IN EVERYTHING ELECTRICAL

(The wide use of farm lighting plants indicates the eagerness of the farmer to obtain the benefits of electricity and his openmindedness as a prospect for electric apparatus and appliances. A saving of chimney wastes and a new socket are further included in the list of new appliances presented below.—The Editor.)

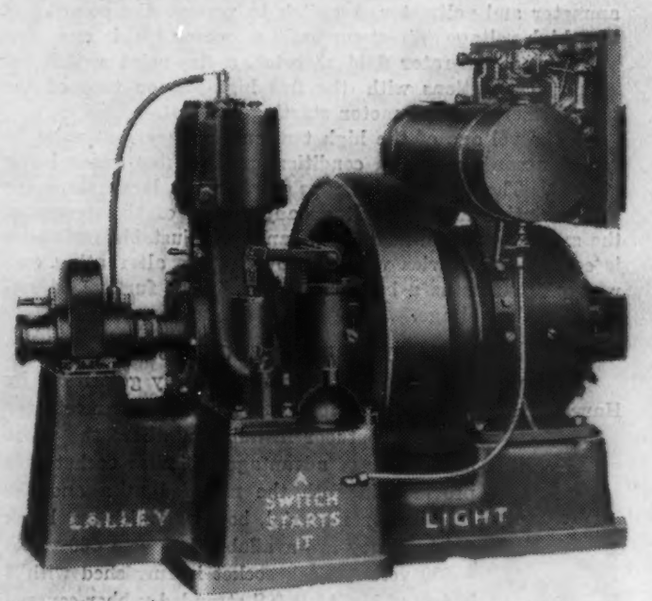
ELECTRIC LIGHT AND POWER FOR THE FARM

BY H. HILL

At a public meeting held during this present world crisis the question was asked, "Who is the most important man in the world today?" After numerous guesses featuring the noted generals of the day, rulers of other nations, as well as executives and ministers of our own country, the correct answer was given—the American farmer. This, without doubt, is true; and, in consideration of this fact, we may well say that the best of everything is none too good for him.

There are seven million farmers in the United States, unusually prosperous, and getting more so, who have availed themselves of modern conveniences like the telephone, the automobile and other motor driven power appliances. This has increased the farmer's vision of what real, modern living conditions should be, and thus has paved the way for the rural resident to sense that he really needs only electricity to completely modernize his living environment,—to enable him to enjoy all of those labor saving conveniences which heretofore have been enjoyed only by his city neighbors; who, by the way, were they suddenly deprived of electricity, would feel that they were set back a hundred years in the progress of civilization.

The advent of Lalley light, a simple and practical light and power unit, selling at a low price, producing electric light and power at a moderate cost, means that in a few years the rural home not equipped with its individual lighting plant will be as rare as the house without an automobile and other modern motor power appliances. The inventor of this plant, designed for use on the farm and in the country and suburban home, knew that it would not give good service if it were at all complicated. He knew that to make this plant a success, he must make it safe against the lack of expert electrical knowledge. And so, it requires not the slightest understanding of electricity, or even of a gas engine, to run and care for a Lalley lighting system. It is easy to install, and the only attention required is the replenishment of oil, fuel and water. Its engine is not of the ordinary farm type—it is a high speed engine especially designed to run an electric generator, and it runs so smoothly that current used direct from the generator produces light as steady and unflickering as when used from the storage battery.



A BALL BEARING ELECTRIC LIGHTING PLANT

Floods the farm home with clean, safe light, also giving power to run grindstones, cream separators, churns, washing machines, etc., and to pump water

The engine has only three moving parts. The carburetor is adjusted and locked by the turn of a nut when the plant is shipped from the factory; no other adjustment is necessary. The points that would ordinarily wear are equipped with big ball bearings; there are no valves, springs or gears to get out of order or require expert attention. Another economy in its favor is that the generator is directly joined to the crankshaft of the engine, and at every revolution of the engine the generator makes a revolution. Fan blades cast in the flywheel drive a constant draft of air through the generator, keeping it cool at all times and enabling it to produce better and more current for less money.

The specifications are as follows: The complete outfit consists of engine, generator and magneto all mounted on iron base; switchboard wired ready for light wires; fuel tank and connections; water tank with connections; Willard storage batteries (16 cells), charged ready for immediate use together with battery signal bell; full and complete directions for setting up and operating.

Batteries —Special type, 16 cells.
Generator —Made especially for Lalley plants.
Ignition —High tension magneto direct connected; no coils, dry cells or other complications.
Carburetor—Special make built into base of plant; permanent adjustment for both starting and running.

Capacity and Dimensions

82 — 20 watt lamps 3 hours
72 — 20 " " 5 "
66 — 20 " " 8 "
50 — 20 " " continuously

Weight of plant 322 lbs., length 27 inches, width 14 inches, height 21 inches.

Up to a short time ago practically none of the farms in this country were equipped with electric light and power for the simple reason that the power companies wanted too much money for running the wires out to the house. But now, times have changed, and the farmer is quick to see that he can enjoy and make use of electric light and power—and not only that, but he can get better service at less expenditure. And so, because the progressive farmer is always on the alert for efficiency, a lighting plant of this nature becomes a farm necessity.

Furthermore, with this up-to-date Aladdin's lamp on the farm, operating pumps, churning butter, and running milking machines and numerous other appliances and farm machinery,—it would truly seem that the tired farmer's wife of whom we used to read, and the bored and restless son or daughter, depicted in the movies as longing to shake the dust of the home farm from his or her feet, would be no more.

ANANIAS would have bought one bond and worn a patriot's button when he could have afforded several—

BUY LIBERTY BONDS

PRECIPITATION FROM FLUE GASES

In refineries of different types there is always a possibility of some valuable by-products, waste, etc., being lost by gases ascending flue. This is particularly true in the metal treating field. Here it has been found possible to save solid and liquid particles from the flue gases by an electrical process. This consists in passing the gases through tubes in which are suspended chains charged with high voltage direct current. In passing through the tube the particles carried by the gases become electrified and are projected against the walls to the tubes. These tubes are grounded and thus the particles drop into hoppers below.

View of treater with 13-foot flues direct to stack and treater

Mechanical rectifiers convert the low voltage alternating current into direct current.

An interesting application of this process was recently made in a copper refinery. In this particular installation there is another noteworthy fact and that is the size of the generating and transforming unit used. In plants of this type, generally the electrical equipment is split up into a number of small units; however, in this case, all the current is handled by a single generator and transformer. A duplicate set has been installed for emergency purposes.

Interior of treater showing electrodes suspended in treater tubes

The Treaters —

The tubes containing the high tension electrodes and through which the flue gases are arranged in six groups. The electrodes are suspended at the top from a rack which provides ample insulation, and are connected with the high tension direct-current line at the bottom. Disconnecting switches permit the current to be cut off from any group to permit inspection and repairs. The gases from the furnaces pass through pipes 13 feet in diameter, a Y with valves being provided so that the gases can be made to go either through the treater or directly to the stack as desired.

It is stated that tests show that over 90% of the flue dust can be removed and that the value of the copper, zinc and other metals recovered will within a short time pay for the treating equipment. It is calculated that at full load ½ ampere high tension direct-current is needed.

Equipment showing Westinghouse motor-generators, transformers and rectifiers

Generating Equipment —

Two 40-kva. 60 cycle, single-phase Westinghouse generators operating at 1800 r.p.m. arranged to deliver voltage ranging from 150 to 250 volts. A direct-current power line supplies excitation current. A 50 h.p. 230 volt, direct-current motor drives each generator.

The transformers are of 40 kva. capacity, 200 volts low tension and 100,000 volts high tension. Additional taps are provided from which voltages of 50, 62½, 75 and 87½% of the maximum voltage can be obtained, the full capacity of the transformer being available on each tap.

Control Apparatus —

The Westinghouse switchboard consists of two panels, one for each generating and transforming set. Each panel carries from top to bottom a circuit breaker on the line between the generator and transformer, an alternating-current ammeter and voltmeter, a switch to reverse the polarity of the high-voltage direct-current, a motor field and line switches, a generator field rheostat, a five-point switch for making connections with the five high-tension taps of the transformer, and the motor starting-rheostat.

The voltage of the high tension direct-current must be varied according to the condition of the flue gases being treated. The transformer taps provide the large steps for this variation and the voltage adjustment of the generator the small steps. In addition a bank of adjustable resistance is connected in series with the low voltage alternating current which acts as a ballast and permits of further adjustment of the voltage.

WEATHERPROOF SOCKETS

A porcelain weatherproof socket recently gotten out by Harvey Hubbell, Inc., of Bridgeport, Connecticut, meets the needs of outdoor installation where the white material is of advantage. Similar sockets are provided in both the moulded mica and the composition material, both of which are black finish. They are available for from 660 watts —600 volts. Each socket is furnished with 6 inches of No. 14 B & S stranded rubber-covered wire. Lamp guards and reflectors are also to be had to fit the sockets.

Weatherproof socket

BOOKS AND BULLETINS

The Coast Banker

A financial survey of coast conditions which will be of interest to electrical men is contained in the October issue of the Coast Banker. This paper is devoted to the financial end of Western business and contains much data with which electrical business men should be familiar.

War Time Light Problems

"War-Time Control of Light" is the title of a new 4-page envelope folder, known as publication 271, being distributed by The Cutler-Hammer Mfg. Co., of Milwaukee, Wis. The folder points out that current, copper and coal, may be saved by the judicious use of pull switches properly placed, thus permitting lights not needed to be promptly cut out of circuit. C-H Pull Switches have the high capacity rating of 6 amperes at 125 volts, which makes them of particular value for controlling large groups of lamps, as for instance, in indirect lighting units where a switch of only three amperes rating would be of insufficient capacity. These pull switches are made with various sizes and styles of caps. One number has a large porcelain base to fit a standard 3¼ inch outlet box.

Incandescent Lamp Standards

A new publication of the Bureau of Standards, Circular Number 13, has been issued recently, entitled "Standard Specifications for Incandescent Electric Lamps." This circular gives the general specifications under which lamps are purchased for the Government, including mechanical and physical characteristics of the lamps, the method of initial inspection and tests and of tests to determine life and candlepower maintenance. The second part of the circular gives schedules of detailed requirements of efficiency rating and life performance of the various sizes and classes of lamps covered by the specifications. These include tungsten (or Mazda) and carbon lamps of the range from 110 to 125 volts and from 220 to 250 volts. The most important changes introduced in this edition are that specifications for gas-filled tungsten (or Mazda) lamps are introduced, and that on vacuum tungsten lamps some adjustment of efficiency ratings has been made to meet changed conditions in manufacture resulting from the war. Since the gas-filled lamps have not heretofore been covered by these specifications and manufacturing conditions are at present somewhat uncertain, the special provision is made that such lamps shall not be rejected if the test life is not less than 1000 hours when the lamps are tested to 75% of the initial candlepower, although the average life is expected to be 1000 hours when tested to 80% of the initial candlepower.

Automatic Compensators

The Electric Controller & Mfg. Co., of Cleveland, Ohio has issued a bulletin covering Automatic Compensators for A. C. Squirrel-Cage Motors which gives in detail their application, design, ratings and sizes and advantages.

A Year Book

A year book has recently been issued by the Western Society of Engineers with headquarters in Chicago, containing their constitution and a list of members and officers.

A New Catalog

The Steel City Electric Company have just issued a new catalog which they are sending out to the trade. It is an attractively bound book of some 110 pages listing their stock with prices and detailed description. Several blank pages are bound in the back of the book for purposes of memorandum.

Electric Ranges

A most effective book on electric ranges, issued by the Rathbone-Sard Electric Company, Inc., features the Acorn Electric Range. The war time service of electricity in the kitchen is pointed out, together with some fifteen "conservation" recipes especiallly designed for electric cooking by the principal of Miss Farmer's School of Cookery, Boston. The advantages of electric cooking and special features of the various types of Acorn range conclude the pamphlet.

Fuel Facts

"Fuel Facts" is the title of an August publication of the United States Fuel Administration. The 64 page booklet is most comprehensive covering the general survey of the problem and what the Administration is doing, and rules and suggestions for the use of coal in the home and in industry. The position of the power plant in the conservation problem is discussed at some length. A brief summary of the fuel oil situation concludes the pamphlet.

A Clean Peace

Perhaps the finest thing about the Allied cause is the unanimity with which all elements of the nations involved subscribe to the unselfish aims so ably set forth by our President. The pamphlet published under the title "A Clean Peace"— gives the complete text of the Inter-Allied Labor and Socialist Conference held in London, Feb. 23, 1918. It makes inspiring reading, for it holds nothing of bitterness but much of high aims and world measures. It parallels the program of President Wilson very closely—with the added endorsement of the expressed views of "inter-allied labor."

Department of Agriculture Year Book

A most valuable compilation of material is contained in the 1917 Year Book of the U. S. Department of Agriculture recently published. To give an idea of the scope of the field covered, the following subjects are discussed among others: Highways, Fertilizers, the Weed Problem, The Service of Cold Storage in the Conservation of Foodstuffs, Cooperative Marketing, The World's Sugar Supply, The World's Supply of Wheat. A statistical appendix gives information on agricultural societies, colleges and officials as well as crops and livestock figures.

Electrical Laboratory Apparatus

The General Electric Company has issued Bulletin No. 40406 describing a complete line of small electrical laboratory apparatus for educational institutions. These units have been designed and built to incorporate the general characteristic features of large commercial electrical types, but of dimensions, capacities and interchangeability of parts adapted to experimental and instruction purposes. Furthermore, with a comparatively small investment of capital, any institution can now equip an electrical laboratory with thoroughly modern apparatus. This bulletin is well illustrated and gives a list of nearly one hundred and twenty institutions where G-E electrical laboratory apparatus have been installed.

Hand Tool Bulletin

C-H Electric Soldering Irons and Hand Tools is the title of a new 8-page envelope folder just issued by The Cutler-Hammer Manufacturing Company of Milwaukee and New York. The folder shows two views of the soldering iron which has a threaded heating core over which the tip is screwed. A new automatic rack which has recently been illustrated and described in the pages of the Journal of Electricity, is explained in detail.

JOB had a good deal of patience—but then he had never met one of these pay-less pay-triots—

BUY LIBERTY BONDS

NEW ELECTRICAL DEVELOPMENTS

(The purchase of street railways by Seattle, and a large irrigation project proposed for the Northwest—more detailed plans for power development in the Pacific Central district—municipal extensions in Southern California and general extension of service lines in the Inter-Mountain District mark the past two weeks period.—The Editor.)

THE PACIFIC NORTHWEST

PORTLAND, ORE.—A one-story shop building, 147 ft. by 269 ft., will be erected at the Benson Polytechnic School for use in special mechanical courses.

TACOMA, WASH.—The city is to start at once on double tracking its electric street car line to the shipyards with the $237,000 allotted to it by the government.

SEATTLE, WASH.—The following items are contained in the city budget for the lighting department: Office equipment $2,000, materials and supplies $120,000.

VANCOUVER, B. C.—The Columbia Block & Tool Company is planning to build foundry and machinery shops, each 50 ft. by 150 ft., at 509 Richard street, to cost about $15,000. An electric traveling crane will be installed.

TACOMA, WASH.—Commissioner Gronen of the light and water department has been authorized to purchase a 1000-kilowatt generator set for use in his department, at a cost of $13,500.

YAKIMA, WASH.—Increase in passenger fares on the interurban lines of the Yakima Valley Transportation Company has gone into effect. The increases generally will amount to five cents above the present charges.

SEATTLE, WASH.—The Standard Electric Company, 73 Horton street, has been awarded the contract for wiring the proposed new plant of the Gulowsen-Grei Engine Company at Salmon Bay. The cost is estimated at about $8,000.

TACOMA, WASH.—The government has approved the city's issue of $300,000 in utility bonds for the purpose of acquiring the Lake Cushman power site. Drilling for the purpose of sinking test holes in the dam basin will be started at once.

TACOMA, WASH.—The fares of school children on the lines of the Tacoma Railway & Power Company are not to be raised although the company is charging a seven cent fare generally in the city, the fare for school children remaining at 2½ cents.

OLYMPIA, WASH.—The State Board of Control rejected all bids for construction of a new power and heating plant at the school for girls at Grand Mound, Washington, the lowest bid being for $16,735, or $8,000 more than the appropriation available.

CHEHALIS, WASH.—The Superior Coal Company is installing electrical equipment at its mine in Chehalis. Electricity will be furnished by the North Coast Power Company. D. W. Proebstel, electrical engineer of Portland, Ore., has charge of the installation.

SEATTLE, WASH.—The City Council has passed an ordinance providing for an issue of $1,200,000 in bonds for an extension of the Seattle Municipal Railway from the city limits north of Green Lake to connect with the elevated line and thence to the Lake Burien line.

SEATTLE, WASH.—The legal department of the city government holds that the city lighting department cannot retire $500,000 outstanding warrants by the issue of utility bonds for the amount, but as an alternative may pay off the debt through future earnings and hereafter issue bonds only for new construction and system additions.

SPOKANE, WASH.—Four one-man, pay-as-you-enter cars are being built at the shops of the Spokane & Inland Railway Company and probably will be put into service on the Altamont line. Three are now in operation on the Rockwood line. The cars are being remodeled from some of the old two-man cars owned by the company.

ROSSLAND, B. C.—The West Kootenay Power & Light Company, which has completed its high-tension transmission line to Northport, will now take active steps toward the construction of a 100-mile line from Greenwood to Copper Mountain in Similkameen county to supply electricity to the Canada Copper Corporation to operate the 2000-ton mill and mines of the company.

SEATTLE, WASH.—The Seattle municipal street car system earned a net revenue of $2,873.20 in August, according to a statement issued by the Public Utilities Department. The total revenue was $15,481.81 and the expense including interest, $11,526.27, leaving a gross profit of $3,955.54. From this amount $1082.54 is subtracted to cover depreciation. The number of passengers carried in August was 315,867, a gain of 18,159 compared with July.

PORTLAND, ORE.—A traction line will soon be built on the Derby street approach to the interstate bridge following the formal signing of a contract with the Kenton Traction Company by the county commissioners. A 25-year period has been allowed the traction company for operation of the car line but by the terms of the contract, if its proved at any time that the company is making a profit on the line, it will be subject to a tax by the county.

SEATTLE, WASH.—J. D. Ross, superintendent of the city lighting department, is making estimates on the cost and method of making connection between the municipal and traction company's power plants. Unification of the two plants was one of the suggestions made by the Emergency Fleet Corporation to conserve electric power in Seattle and insure sufficient current to operate the street cars and keep the shipyards and other war industries going. This connection is to be made at once.

NORTH VANCOUVER, B. C.—In a resolution passed unanimously by the city council of North Vancouver it was decided to ask the Union of British Columbia Municipalities, at their convention in Penticton in September, to endorse a petition to the provincial government for the establishment of a hydroelectric commission for the development and control of British Columbia water powers. This commission would take pattern from the activities of the Ontario Hydroelectric Commission.

DAVENPORT, WASH.—County commissioners have granted a franchise to the Inter-Mountain Power Company for a line to run from Long Lake south into Lincoln county to connect with the Milwaukee Railroad. The Washington Water Power Company of Spokane, from which the Inter-Mountain Company secures its power, has agreed to have the new unit at Long Lake ready by May 1. The line is for the purpose of supplying the Milwaukee road with electricity at Othello for operating its trains over the mountains to Seattle.

PENDLETON, ORE.—In consequence of the visit here of Harvey Wells, state insurance commissioner, and J. N. McEwan, representing the insurance underwriters, it is practically certain that Pendleton will be provided with an auxiliary water source. The provision for the auxiliary system will mean the installation of a pump at the site of the old

pumping station at the eastern edge of the city. The cost will be, it is estimated, in the neighborhood of $3500.

VANCOUVER, B. C.—In a letter addressed to Mayor Gale and the city council of Vancouver, B. C., General Manager George Kidd of the British Columbia Electric Railway reaffirms his belief in the company's legal rights under the six-cent fare by-law to charge that amount for street car rides in the city. The city council has officially requested that the company cease charging in excess of a five-cent fare until such time as the rate payers have either sanctioned or rejected the six-cent fare by-law on October 5 and has asked for an injunction.

SEATTLE, WASH.—Under an agreement with A. M. Taylor, director of transportation and housing of the U. S. Shipping Board, arrangements have been made whereby the city will borrow the sum of $392,000 for street railway improvements, of which sum $330,000 will be repaid by the city. The Fleet Corporation requested the city to extend its elevated line in course of construction from Spokane street and Whatcom avenue to 1st avenue, the cost to be about $50,000. The Fleet Corporation will loan the city $217,000 with which to purchase 31 cars, etc.

TACOMA, WASH.—Development of the Lake Cushman power project was favored at a recent meeting of the city council by Commissioners Shoemaker and Grosen. Prof. Henry Landes in his report made after a recent examination of the reservoir, indicated that it might leak 15 to 30 per cent. Both commissioners, however, felt that this amount of leakage should not prevent going ahead with the plant. The council has considered drilling test holes to determine what the chances are of stopping any leaks that might be found. It is estimated that this work would cost from $2,500 to $3,000.

NORTHPORT, WASH.—The construction of power lines to the plant of the Northport Smelting and Refining Company of Northport, Washington, and the Canada Copper Corporation near Princeton, B. C., is proceeding steadily according to reports from the respective fields. These lines which are being installed by the West Kootenay Power & Light Company, a subsidiary of the Consolidated Mining & Smelting Company, will convey power from Bonnington Falls, via Trail, B. C. Cost is estimated at $1,000,000 but may exceed that. The power will be used in running the smelter at Northport and in the mining and concentrating operations at Copper Mountain.

SEATTLE, WASH.—The possibilities of irrigating thousands of acres of arid land in Walla Walla and Franklin counties, by constructing a huge dam at Five Mile Rapids on Snake River and developing a hydroelectric plant from the power, were under investigation by A. P. Davis, director and chief engineer of the United States Reclamation Department at Washington, and R. K. Tiffany, project manager of the government systems in the Yakima Valley, during a trip to that section of the county three weeks ago. A subsequent visit to Five Mile rapids by Mr. Tiffany a few days ago lends color to the rumor that the government has vast irrigation plans in view by utilizing the power of Snake River.

VANCOUVER, B. C.—It has been announced that the British Columbia government will appoint a Public Utilities Commission to handle such situations as that existing between the British Columbia Electric Railroad Company and the city of Vancouver regarding an increase in fares. The commission will be invested with wide powers, not only over public utilities but also over municipalities. It will have authority similar to the Dominion Ralway Board to hear and investigate complaints, make orders as to service and improvements, fix the rates to be paid and make investigations into the affairs of companies for the purpose of ascertaining the financial returns necessary for successful operation.

THE PACIFIC CENTRAL DISTRICT

MANILA, P. I.—Secretary Jacosalem of the Commerce and Communications has directed the release of 240,000 pesos for the extension of wireless and telegraph service lines.

SACRAMENTO, CAL.—Arrangements are being made by the Northern California Power Company of San Francisco for the erection of an electric transmission line from Pitt River to Sacramento.

VALLEJO, CAL.—The Bureau of Yards and Docks, Navy Department, Washington, D. C., is contemplating the installation of a turbo-generator at the navy yard, Mare Island. Specification 3352.

SAN FRANCISCO, CAL.—The Telephone Operators' Union will take final action shortly on its new scale, calling for a wage of $2 for beginners to a maximum wage of $4 a day for experienced operators.

FRESNO, CAL.—The San Joaquin Light & Power Corporation is contemplating the construction of a substation in the vicinity of California and Orange avenues to supply electricity to the large plants in that vicinity.

STOCKTON, CAL.—The Western States & Electric Company has accepted a contract from the Stockton Wool Scouring Company for 150 horsepower in motors covering a period of five years. The installation will displace a steam plant.

SAN FRANCISCO, CAL.—The supervisors have passed an ordinance authorizing the Board of Public Works to enter into a contract for furnishing and installing an 8-in. centrifugal pump and motor at the Commercial Street pumping station.

SACRAMENTO, CAL.—Specifications for a centrifugal pumping unit electrically driven, to be installed at the city water works, were adopted by the city commission and bids will be opened on October 1st. The estimated cost is about $25,000.

VALLEJO, CAL.—Extensive improvements and extensions are contemplated by the Vallejo Light & Power Company, including the installation of new transformers, etc., the erection of a second transmission line (pole) from South Vallejo to the Kentucky street plant.

SAN FRANCISCO, CAL.—Modification of the lightless night order, which will permit of exterior lighting on all evenings except Monday and Tuesday of each week, will be the new order commencing October 1, State Fuel Administrator Albert E. Schwabacher has announced.

SANTA ROSA, CAL.—The articles of incorporation of the reorganized Petaluma and Santa Rosa Railway Company, which was formed to take over the Santa Rosa and Petaluma Railroad Company in the plan to refinance the electric line, have been filed with the County Clerk.

SACRAMENTO, CAL.—Half a million dollars' worth of reclamation work has been contracted by the Conway Land Company in order that 20,000 acres of land in Yolo county may be made possible for planting. Water will be pumped from the Sacramento river and distributed through a ditch system that is to be constructed.

SAN FRANCISCO, CAL.—The Northern California Power Company Consolidated notified the Stock and Bond Exchange that assessment No. 8 of $1.50 per share on the stock, payable immediately, had been levied. The assessment becomes delinquent October 8, and November 5 has been named as sale day for stock on which the assessment is not paid.

PRESIDENT WILSON says we are in this war until the principles for which America is fighting are accepted—

BUY LIBERTY BONDS

SAN FRANCISCO, CAL.—Industries not wholly engaged in the manufacture of war materials are to be further restricted in the use of power, according to Albert E. Schwabacher, Federal Fuel Administrator for California, who has just received authority for such action from the priority committee of the National Fuel Administration. All power companies will be instructed to forward lists of their customers, addresses, classes of work performed and amount of power consumed and percentage of war materials made.

OROVILLE, CAL.—Although officials of the Great Western Power Company declare that they have no information upon which to judge as to where the government will probably erect power plants on the Pacific Coast under the administration bill now pending for the construction of hydroelectric plants, it is believed almost certain that the Oroville plant of the Great Western Power Company will be constructed under this act. Announcement has been made at Washington that $10,000,000 would be available for Pacific Coast construction.

BAKERSFIELD, CAL.—The new 36-mile gas line of the San Joaquin Light and Power Corporation, extending from the Midway Gas Company line in the west side oil belt to the power company's steam plant in Bakersfield, is nearly completed. The company will now burn natural gas for its boilers instead of fuel oil, thereby effecting a large saving in fuel for war purposes. The saving to the company is estimated at $1500 to $2000 per day. The new gas line cost about $200,000 and will pipe about 6,000,000 cubic feet of gas to the power plant daily.

OROVILLE, CAL.—That the Great Western Power Company may change its plan and construct a power house in Butte Valley prior to the construction of the Oroville plant is indicated by the report of President Mortimer Fleishhacker, copies of which have been received in Oroville. Discussing the question of new construction, Fleishhacker states that it is planned to add four feet to the height of the spillway at Lake Almanor, which will increase the capacity of Lake Almanor from 300,000 feet to 380,000 acre feet. The cost will be $100,000. The report states that "it is proposed to complete this work before the next run-off season is past."

THE PACIFIC SOUTHWEST

LOS ANGELES, CAL.—Purchase of equipment to extend power and light service in the San Fernando valley has been authorized by the city council.

GLOBE, ARIZ.—The Iron Cap Copper Company, it is reported, is considering improvements to its property, including the installation of an electric power plant.

NEWPORT BEACH, CAL.—In connection with the proposed irrigation project by the Newport Mesa district, plans are being prepared for the installation of a pumping plant.

SAN JACINTO, CAL.—The Southwesetrn Home Telephon Company has had plans prepared for the construction of a new one-story building in Main Street, about 25 by 40 ft.

PASADENA, CAL.—The Board of Education has had plans prepared for extensions in the boiler plant at the local high school building at Colorado street and Sierra Bonita avenue.

MANHATTAN BEACH, CAL.—The installation of new ornamental lamp standards and appliances on Neptune Avenue and other streets is under consideration by the city trustees.

GLENDALE, CAL.—An issue of $1,000 bonds for the purchase of the distributing system of the Southern California Edison Company in municipal district No. 1 has been awarded to William R. Staats & Company.

GLENDALE, CAL.—The city of Glendale has been advised that the Capital Issues Committee of San Francisco has approved the bond issue recently voted in Improvement District No. 2 for $44,000 to purchase the distributing system of the Southern California Company there.

LOS ANGELES, CAL.—Sealed bids will be received by the Board of Public Service Commissioners up to October 8th, for furnishing the department high voltage transformers, in accordance with specifications on file at the office.

YUCAIPA, CAL.—At a recent meeting of the Redlands & Yucaipa Land Company the question of installing a pump at the auxiliary plant was discussed and it was unanimously adopted that the pump be put in as soon as possible.

LOS ANGELES, CAL.—The Public Service Commission has let a contract for a complete hydroelectric generating system to be installed in a power house at Haiwee on Owens river, to Archer & Baldwin of New York, at $31,500. Work will begin as soon as material arrives.

VAL VERDE, CAL.—In connection with a bond issue for $135,000 recently authorized for the construction of a new local irrigation works, the proposed plant will include pumping stations with necessary apparatus. It is understood that the stations will be electrically operated.

LOS ANGELES, CAL.—The San Joaquin Light & Power Corporation has been granted permission by the State Railroad Commission to use the proceeds from the sale of $202,761.07 of series "C," 6% bonds authorized by the commission to finance the construction expenditures.

LOS ANGELES, CAL.—The Department of Public Service is planning for the construction of a large new electric power plant, and has made application to the State Water Commission for permission to divert 120 cubic feet per socond with a storage of 24,227 acre feet per year, of the waters of the South Fork, Kern Fiver in Tulare county.

THE INTER-MOUNTAIN DISTRICT

BEAVERTON, MONT.—The erection of a telephone line from Nelson Reservoir to Beaverton has recently been completed.

INGOT, CAL.—The construction of an electrolytic plant at its mines is reported to be under consideration by the Afterthought Copper Company.

KALISPELL, MONT.—A new turntable for the Great Northern Railway Company at Whitefish will be operated electrically with power furnished by the Mountain States Power Company, Kalispell division.

WHITEFISH, MONT.—Another toll line has been completed between Kalispell and Whitefish, by the Mountain States Power Company, to care for the increasing telephone business between these towns and connecting Missoula and other cities.

MERIDIAN, IDA.—An electric transmission line was constructed from Wilder to the Riverside Irrigation District camp, a distance of some 10 miles, for moving excavators to their new location. Buildings were re-erected, including a substation containing a bank of three 200 kilowatt volt ampere transformers.

PAUL, IDA.—Electrical installation of the Paul substation on the Minidoka Irrigation Project has progressed. The steel for the three substations to be built on the north side has been received and some preparatory work has been done. There were six interruptions to the delivery of power from the power house, one only of which was caused by power equipment.

KALISPELL, MONT.—The subject of irrigating Montana lands is receiving a great deal of attention nowadays. A recent gathering of fifty farmers and representatives from the Kalispell Chamber of Commerce was held to discuss the best means of irrigation. W. B. MacDonald, manager of the Mountain States Power Company, Kalispell division, outlined the advantages of irrigation with electric power and told of the experience of his company in serving such installations. He also pointed out that the cost of irrigation by electric power was only $1.00 per acre. As a result of the meeting it is believed that a large additional acreage will be under irrigation next year.